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SUMMARY OF RECENT ABSTRACTS*

V. LEISHMANIASIS

VISCERAL LEISHMANIASIS

Epidemiology: Transmission

SERGENT and SERGENT (p. 1132) have summed up the growth of knowledge of oriental sore and kala azar in North Africa. LOZANO MORALES (p. 126) reports kala azar in children from rural areas of Spain, and GOMEZ and DE CISNEROS (p. 126) state that both visceral and cutaneous leishmaniasis occur in the province of Murcia, Spain. BILHAN (p. 21) reports kala azar from Turkey. PREVITERA and BONGIARDO (p. 128) report leishmaniasis in 7 per cent. of dogs whose spleens were examined in Catania, Sicily, and HO *et al.* (p. 342) report visceral leishmaniasis with cutaneous manifestations in dogs in Sian, China.

PETRISHCHEVA (p. 535) has made a study of sandflies of the genus *Phlebotomus* in the hot desert areas of Central Asia. The sandflies were common in the burrows of gerbilles, ground squirrels, and tortoises, and in holes occupied by wolves, jackals and foxes. The author has studied the microclimates of these resting places. The flies were abundant in desert country in April and the early part of May, but they were not found during the rest of the year until early the next spring; there is, apparently, only one generation each year. In the mountains they were found in holes occupied by wolves, and were caught from April to November.

CHUNG *et al.* (p. 341) report two cases of kala azar in children who had received blood transfusions from their mother, who was subsequently found to be suffering from the disease.

Experiments with *Triatoma* do not suggest that these bugs could act as hosts for species of *Leishmania* (PACKCHANIAN, p. 21).

Aetiology: Clinical Findings

KIRK (p. 621) discusses the grounds on which the various species of *Leishmania* which affect man have been differentiated by those who have worked on the corresponding diseases. He sums up a great body of literature, and finally gives his opinion that in spite of difficulties in relation to morphological, immunological and serological differentiation, and in relation to differentiation

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1949, v. 46. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

by animal inoculation and transmission tests, the continuity of clinical types of leishmaniasis justifies the recognition of three species : *Leishmania donovani, L. tropica* and *L. brasiliensis*. The same author (p. 815) describes a strain of *Leishmania* originally isolated from a man in the Sudan ; this strain caused visceral, cutaneous and muco-cutaneous lesions in some of the monkeys into which it was passed, but later it apparently lost its virulence for monkeys.

TRINCÃO (p. 1018) shows that the survival time of leishmaniae grown in tissue culture varies inversely with the rapidity of tissue growth, and that phagocytosis is intense in the early stages. Inoculation of leishmaniae into the yolk sac of the developing hen's egg, however, gives good multiplication, and the normal development of the embryo is not checked.

ADA and FULTON (p. 925) have investigated the serum proteins of golden hamsters infected with *L. donovani*, finding a decrease in albumin and an increase in α-globulin. The pattern returned to normal for a short period after an injection of sodium stibogluconate, but became abnormal once more after a few weeks. Lipaemia also occurs after infection, and the authors think that this and the serum protein changes are due to the activity of the parasites rather than to any associated renal changes. RITTERSON and STAUBER (p. 450) show that protein deficiency is deleterious to hamsters infected with leishmania.

TRINCÃO (p. 127) describes a new gelification test, in which HCl is added to serum ; in kala azar a gel tends to form, and this phenomenon is rarely observed in other conditions.

SANCHIS BAYARRI and MARCO AHUIR (p. 127) have used the methylic tuberculosis antigen of Boquet and Nègre for a complement fixation test in kala azar, apparently with some success.

TRINCÃO (p. 1018) finds that the anaemia of kala azar cannot be explained by any defect in the absorption of iron. He (p. 1019) has studied the bone marrow and the splenic tissue in this disease.

XHAARD (p. 242) reports a case in which a diagnosis of kala azar was made and in which the patient showed polycythaemia.

From experience with African troops fighting in an endemic area of kala azar in Africa, CORKILL (p. 21) concludes that arduous battle conditions tend to precipitate attacks of this disease. A comparable phenomenon was the onset of relapses or of first attacks of malaria after the battles in Europe in 1944. The same author (p. 22) has found a seasonal relationship between malaria, relapsing fever and kala azar in the Sudan, and thinks that the two former diseases tend to activate latent kala azar.

Treatment

MORTON and COOKE (p. 243) discuss splenectomy in kala azar, quoting two recent cases in which response to drugs was poor until splenectomy was performed. They give references to cases recorded in the literature, and discuss the question of resistance to antimony, which was one of the indications for surgical intervention.

In a careful assessment of the effect of urea stibamine on kala azar in a large number of patients in China, HO *et al.* (p. 815) found that the fewer the parasites discovered on sternal puncture, the sooner they disappeared, and that injections given once each week were rather more effective than injections (to the same final total of the drug) given twice each week.

DANA *et al.* (p. 341) report two cases of kala azar in which cure was obtained with the preparation Glucantime [antimoniate of N methylglucamine, or 2168 R.P.]. The authors remark the danger of overlooking kala azar in patients with malaria, especially when splenomegaly persists after the temperature has fallen as a result of antimalarial treatment. The same French

antimonial drug has been used with success in the treatment of kala azar by SARROUY *et al.* (p. 924), D'ESHOUGUES and MESSERSCHMITT (p. 924), LEONARDI and PINNA (p. 1019), and D'ESHOUGUES (p. 1132).

SEN GUPTA (p. 1134) has used hydroxystilbamidine with success in several cases of Indian kala azar.

SATI (p. 1133) discusses the neuropathy which often follows treatment with stilbamidine, on the basis of 41 cases. The onset of symptoms occurred 1 to 13 months after cessation of treatment, and they lasted up to 90 months. The 5th cranial nerve was always involved, and other cranial, cervical and dorsal nerves were sometimes affected. No form of treatment was effective. In all cases stilbamidine could be detected in the urine.

HAZARIKA (p. 925) reports success in the treatment of Indian kala azar (some cases of which were resistant to antimony) with pentamidine isethionate. Although the "cure rate" immediately after treatment was 94 per cent., there was a relapse rate of 38 per cent. The maximum daily dose was 1·0 or 1·5 mgm. per pound of body weight, but the author thinks that higher doses could have been given. Details of administration should be sought in the original abstract.

DE SOUSA and DE ALMEIDA (p. 1020) used Lomidine (a diamidine) successfully in a case of infantile kala azar resistant to antimony.

CUTANEOUS LEISHMANIASIS

Almost a quarter of a large number of people examined in the Italian province of Teramo (Abruzzi) show evidence of active or cicatrized cutaneous leishmaniasis (CORRADETTI, p. 1020).

FORBES (p. 1020) discusses a case of oriental sore in a student from Aleppo. Diagnosis was made by both smear and culture.

It has recently become apparent that cutaneous leishmaniasis occurs in the French Soudan. LEFROU (p. 816) describes two forms: the classical ulcerative form and a dry form which does not ulcerate, and which tends to heal in a few months. The distribution of cutaneous leishmaniasis coincides with the distribution of *Phlebotomus* of the *papatasi* group.

CANGELOSI (p. 342) refers to a series of Italian prisoners of war with cutaneous leishmaniasis, who came from several formerly Italian territories in Africa. The incubation periods varied from 2 to 37 months. Local injections of mepacrine gave relatively good results in a few cases, and local treatment with antimony ointments or sulphonamides, or local injections of emetine, were found to be useful.

ADLER and ZUCKERMAN (p. 449) have made observations on a strain of *Leishmania tropica* which has been maintained in culture for 22 years. It is now non-pathogenic for hamsters (although originally capable of infecting them) but remains pathogenic for man, and produces general hypersensitivity in addition to the local lesion. The authors quote their experiments as an instance of the Arthus reaction produced by a protozoon.

OSNES (p. 244) reports a case of dermal leishmaniasis which appeared in a patient with kala azar when treatment was first given. In this respect it differed from the more common dermal leishmanoid, which usually appears at a much later stage.

CORRADETTI (p. 1134) reports that treatment of all houses with DDT residual spray in part of the Italian province of Abruzzi has greatly reduced the numbers of *Phlebotomus perfiliewi*.

AMERICAN MUCO-CUTANEOUS LEISHMANIASIS

BUSTAMANTE (p. 127) discusses leishmaniasis in America, noting that it is most common in wooded, moist and warm areas. He names species of

Phlebotomus known to be natural vectors. Collectors of chicle gum are prone to infection in the course of their work.

PUELLO GARCIA (p. 622) discusses muco-cutaneous leishmaniasis as it occurs in the endemic area of Colombia, and where the dog is probably a reservoir. He has used chloroquine by mouth in treatment of 21 cases, with promising results. The doses used were rather higher than those normally given in malaria. A case of American visceral leishmaniasis, probably from a new focus in Brazil, is recorded by DE ARRUDA *et al.* (p. 816).

PEÑA CHAVARRIA *et al.* (p. 342) report on cutaneous leishmaniasis in Costa Rica, analysing 100 cases. They propose a classification according to the skin lesions. RAMOS E SILVA (p. 714) records a case of American cutaneous leishmaniasis in which papulo-pustular lesions became generalized over the body, probably as a result of auto-inoculation with possibly a spread by the blood stream. ORTIZ and PARDO (p. 1134) report a case of generalized American cutaneous leishmaniasis which closely resembled leprosy.

Eparseno (a preparation of amino-arseno-phenol) is used in the treatment of American cutaneous leishmaniasis. PESSÔA and VILLELA (p. 343) tried it on one series of patients to whom they gave increasing doses at intervals of 2 days for 5 injections, followed by an interval and then by constant doses, and on another in constant doses daily for 10 days, repeating the course after an interval. They prefer the second method as being less toxic, but good results were obtained by each. Details are given.

CAMPOS (p. 926) has tried Bogalita (formaldehyde sulphoxylate of sodium) in American cutaneous leishmaniasis. It had some effect, but the number of cases treated was small. *Charles Wilcocks*

MALARIA

WILSON, D. Bagster. **On the Present and Future Malaria Outlook in East Africa.** *East African Med. J.* 1949, Dec., v. 26, No. 12, 378–85. [11 refs.]

The malaria situation in East Africa is shown to exist in three specialized epidemiological zones: (1) the epidemic, (2) the hyperendemic and (3) the endemic. The epidemic zones occupy a small portion, though extension is continually taking place; they are characterized by a short annual season of acute malaria but in some years this may be altogether absent. The hyperendemic zone comprises vast tracts of country including the greater part of Uganda, Tanganyika, Nyasaland and about a third of Kenya; the transmission of malaria is maintained for the greater part of the year and re-infection occurs as often as 50 times. In pristine conditions, there is little evident fever among the adults, but partial protection from mosquito bites, the use of antimalarial drugs, non-immune immigration, and other factors lead to a decrease in resistance and an increase in the number of attacks of malaria. The endemic zone is more variable and by some workers unfamiliar with Africa would be termed hyperendemic; transmission is periodic and there are considerable intervals when the disease is absent. There is little immunity among the inhabitants or its development is delayed until after puberty, and the adults are liable to suffer from actual fever.

The author thinks it unlikely that measures against adult mosquitoes (*e.g.*, residual DDT) alone will be effective in hyperendemic zones, though where *Anopheles* are in smaller numbers as in epidemic or endemic zones, this form of control may be successful if applied to large groups of houses. Individual houses will not be protected by residual spraying unless the dosage is above

200 mgm. per square foot or screening is employed as well. In regard to the use of DDT as a larvicide, possibilities of improved efficiency exist, but methods have not yet been standardized. Application of larvicides by aircraft is useful in restricted areas. In rural communities, the simple yet fundamental measures like siting of villages and control of water sources remain of great importance. The newer drugs like paludrine and chloroquine have only a limited applicability, and should be confined (for prophylactic use) to small groups of susceptible people in hyperendemic areas.

The author discusses briefly the present problems of malaria research in East Africa, mentioning first the effect of the disease on the health of the African in hyperendemic localities, a question which can be answered only by observing what happens to such people after removal of malaria from their environment, then the possibility of increasing immunity by artificial means such as vaccination, and finally studies on the bionomics of the vector anophelines. *P. C. C. Garnham*

WILSON, D. Bagster. **Commentary on a Malaria Survey of Machakos District by J. C. J. Callanan.** *East African Med. J.* 1949, Dec., v. 26, No. 12, 386–90.

Twenty years ago Dr. J. C. J. Callanan, then of the Kenya Medical Department, carried out an extensive malaria survey of the Machakos District, including records of over 10,000 spleen rates and 8,600 blood examinations [many of the latter were done by the reviewer]. The results were never published and the present paper is a summary of the main features. Malaria (almost exclusively due to *A. gambiae*) varied from the slightly endemic type to truly hyperendemic, and while the survey was in progress became epidemic, in part of the district. In the places affected by the epidemic the spleen rates rose by anything up to 25 per cent. ; the parasite rates were more variable, but in some localities doubled after the epidemic. Nearly 90 per cent. of the infections were due to *P. falciparum*, 14 per cent. *P. malariae* and 5 per cent. to *P. vivax* (the percentages include mixed infections). This summary is of value in indicating the conditions prevalent in the area 20 years ago and will undoubtedly be useful to future workers.

P. C. C. Garnham

PARAENSE, W. L. Alguns aspectos da evolução exoeritrocitária dos plasmódios. [**Some Aspects of the Exo-erythrocytic Cycle of Plasmodia.**] *Med. Cirurg. Farmacia.* 1949, Dec., No. 164, 720–27.

SEN, P. **Anopheles Breeding in the Ricefields of Lower Bengal : its relation with the Cultural Practices and with the Growth of Rice Plants.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 221–37, 4 figs. [13 refs.]

At Madhyamgram, near Calcutta, 61 rice plots were examined for anopheline larvae once a week from June to October and at Sonarpur, a few miles away, 136 plots were examined once a fortnight from July to December during two consecutive rice seasons. Larvae of 11 species were found : *Anopheles philippinensis*, the local malaria vector, *A. hyrcanus* var. *nigerrimus*, *A. barbirostris*, *A. annularis*, *A. ramsayi*, *A. pallidus*, *A. tessellatus*, *A. varuna*, *A. aconitus*, *A. vagus* and *A. subpictus*.

In fallow fields *A. vagus* and *A. subpictus* occurred and a few *A. hyrcanus* var. *nigerrimus*. In cultivated fields at Sonarpur all 11 species were present while at Madhyamgram *A. aconitus* and *A. tessellatus* were absent.

During the transplanting season larvae of *A. vagus* and *A. subpictus* persisted in the muddy water ; the other species began to appear as the silt settled. At the beginning of the season when shade was absent the water temperature occasionally reached 42°C. and over and in such conditions only the larvae of *A. hyrcanus* var. *nigerrimus* and *A. vagus* were found.

As the rice grew and provided more shade, larvae became more numerous ; most were found in water 2 to 12 inches deep and where the rice was 1 to 2 feet in height. Larvae of *A. philippinensis* first appeared when the rice was 15 inches high but disappeared again after it reached 2 feet in September.

Harvesting of the rice in October and November disturbed the environment and increased the organic contamination of the water in which only larvae of *A. hyrcanus* v. *nigerrimus* and *A. annularis* could then be found.

A. philippinensis is the only natural vector of malaria in these areas and the author feels that he has shown by these studies that rice fields are not nearly so dangerous as are the permanent ponds in villages, where the breeding of this species is particularly prolific. *H. S. Leeson*

SEN, P. **Records of Natural Infectivity of Anopheles in West Bengal.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 239–45. [14 refs.]

" 1. Infectivity in *A. sundaicus* has been recorded from Calcutta, and its environs including the salt lakes during July to December. The incidence of infection was on an average 7·7 per cent, and varied in the different months.

" 2. Infected specimens of *A. philippinensis* were found in Madhyamgram about 10 miles to the east of Calcutta during the months June to December 1936. The average infection rate was 6·6 per cent with monthly variations ; the maximum was reached in August and September.

" 3. Infectivity in *A. minimus* was detected in a single collection from the tea gardens at Dam Dim (Jalpaiguri) in the submontane zone during September 1942, and the rate of infection was 5·9 per cent.

" 4. Ten other common species dissected for malarial infection proved negative."

CHOW, C. Y. **The Anopheline Mosquitoes of Taiwan (Formosa), China.** Reprinted from *Quart. J. Taiwan Museum.* 1949, v. 2, No. 1, 1–8. [25 refs.]

A very brief account is given of the 16 species of *Anopheles* occurring in Taiwan (Formosa). Two keys to identification include one to females and one to fourth instar larvae. A table shows the distribution of the species according to Prefecture and this is followed by short notes on each species. *Anopheles hyrcanus sinensis* is probably the chief vector of malaria in the plains while *A. minimus* is the chief vector in the hilly regions. *H. S. Leeson*

BROOKE, M. M. & DONALDSON, A. W. **Use of a Surface Active Agent to prevent Transfer of Malarial Parasites between Blood Films during Mass Staining Procedures.** [Research Notes.] *J. Parasitology.* 1950, Feb., v. 36, No. 1, 84–5.

BROOKE and DONALDSON [this *Bulletin*, 1948, v. 45, 1056] demonstrated the risk of blood elements being transferred from one thick blood film to another during mass staining procedures.

They have therefore studied staining modifications designed to reduce this risk and will report their full results elsewhere. During these experiments, it was noted that many of the separated blood elements floated on the surface

of the staining solution. Experiments were therefore designed to determine whether a surface active agent might so reduce the surface tension that the detached blood elements would sink to the bottom of the container and thus be less likely to adhere to other films.

Slides in groups of 25 or more, with normal blood films and malaria-positive films alternating, were stained for 45 minutes in glass containers of 1/50 Giemsa stain containing 0·5 per cent. of Triton X-30 (a 33 per cent. aqueous solution of an alkylated aryl poly-ether alcohol). Control slides were stained with the same stain without a surface active agent.

Nine experiments were made, seven from malarious human blood and two from avian blood. None of 225 normal films stained together with malarial films in Giemsa having 0·5 per cent. of the added surface active agent showed any transferred parasites, while 83 (47·4 per cent.) of 175 normal films similarly stained in untreated Giemsa stain did show transferred parasites. Where avian blood was used together with normal films, the transfer rate in the case of the Triton-Giemsa mixture was 6 per cent. compared with 80 per cent. when ordinary untreated Giemsa stain was used.

The surface active agent did not appear to interfere with the staining, and, indeed, the films stained in the Giemsa-Triton mixture were much cleaner. The subject is being studied further. *H. J. O'D. Burke-Gaffney*

HENSCHEL, A.; TAYLOR, H. L.; KEYS, A.; WELLS, S.; HOFFBAUER, F. W.; SIMONSON, E. **Experimental Malaria in Man. I. Physical Deterioration and Recovery** [HENSCHEL, TAYLOR & KEYS]. *J. Clin. Investigation.* 1950, Jan., v. 29, No. 1, 52–9, 1 fig. [17 refs.] **II. Liver Function** [KEYS, WELLS, HOFFBAUER, TAYLOR & HENSCHEL]. *Ibid.* 60–67, 1 fig. [31 refs.] **III. The Changes in the Electrocardiogram** [SIMONSON & KEYS]. *Ibid.* 68–71, 1 fig.

Twelve healthy male volunteers aged 20–33 years were used for these experiments. They lived in the laboratory and had their meals there throughout a period of 12 months. After a control period of three to four weeks, each subject was inoculated with the McCoy strain of *P. vivax* by intravenous injection of 3 cc. of infected blood. Malaria developed in all cases. During paroxysms patients were treated in bed and water intake was maintained at more than 3,000 cc. daily and the standard diet, 3,600 Cal. with 85 gm. protein, was offered daily although at times food consumption dropped off. After five to eight paroxysms malaria was terminated with quinine sulphate. The quinine was continued for 21 consecutive days and there were no relapses.

I.—Physical deterioration and recovery: Subjects were exposed to a standard activity before the onset of malaria, and from the third day after the last paroxysm. The standard activity consisted of routine work around the laboratory, plus one hour daily of walking round a controlled motor-driven treadmill; three to five minutes' work at maximum intensity was included every few days. In the testing room the temperature was maintained at 78°F. with a relative humidity of 50 per cent. Functions tested were followed at frequent intervals.

There was a progressive decrease in blood haemoglobin concentration in all subjects, the average loss being 2·4 gm. per 100 cc. of whole blood. The loss continued for up to 0·9 gm. per 100 cc. of blood during the first five fever-free days after quinine administration. From then on regeneration of haemoglobin continued at the rate of about 1 gm. per 100 cc. of blood per week. Complete return to control values (mean 15·1 gm. per 100 cc.) took about five weeks after termination of malaria. Blood volume was estimated before inoculation and on the second post-febrile day. There were no significant changes in

plasma volume during the course of the malaria, but some reduction in total blood volume occurred and was reflected in the haematocrit and red cell volume.

Blood lactate and pyruvate estimations over the period of experiment showed that the former was increased during standard rest and after short exhausting work ; the latter was increased after hard work but the resting value was not changed. These changes in lactate and pyruvate reflected changes in response to work. Pulse rate during moderately severe work was increased and the recovery rate of the pulse after work was increased on the third post-febrile day. Normal values were obtained three weeks later. The maximal oxygen intake was decreased by nearly 20 per cent. on the fifth post-febrile day. Normal values were obtained after six weeks. The maximal performance capacity as calculated by the Harvard fitness test remained depressed after the malaria until the eighth post-febrile week . The effect of malaria on the cardio-vascular response to change from the horizontal to a tilted position showed a deterioration of 50 per cent. during the malaria. Normal figures were obtained three or four weeks after the malaria had been treated.

The excretion of 17-ketosteroids was depressed during the experimental malaria.

The authors point out that the batteries of tests used show that some bodily systems are affected " rather seriously " while others appear to remain normal after malaria. The possible relationship between the decreased blood haemoglobin concentration and the increased work pulse rates that followed the malaria is discussed. The work and recovery pulse rates were the first to return to normal, *i.e.*, in about three weeks after malaria. The haemoglobin concentration recovered by the end of four weeks.

II.—Liver function : Attempts were also made to determine the effects of the induced malaria on a series of liver " functions ".

Results were as follows :—

The one-minute and total plasma bilirubin rose during the first paroxysms from mean control values of 0·069 and 0·76 mgm. per 100 cc. to 0·19 and 1·39 mgm. per 100 cc. The corresponding figures during paroxysms four to seven were 0·20 and 1·60 mgm. per cent. Bilirubin was not found in the urine. Urobilinogen excretion rose progressively in the first febrile stages and throughout the period of paroxysms. Plasma bilirubin and urobilinogen excretion both returned to normal within a week from the start of quinine therapy.

The authors calculate that during the malaria the liver had a load of about four times the normal amount of degraded haemoglobin to dispose of, and concluded that the plasma bilirubin figures found represented only a moderate degree of actual impairment of liver cells.

Bromsulphthalein retention (45 minutes) was increased in the early febrile stages and reached 11·3 per cent. during paroxysms four to seven. Normal values were regained in a very few days after quinine therapy had been instituted.

Thymol turbidity values consistently rose but did not surpass the upper limits of normal. Cephalin-cholesterol flocculation increased after several paroxysms, and in most cases were highest in the first few weeks after quinine.

There was good correlation between the cephalin-cholesterol flocculation results, and the percentage of serum protein represented by gamma globulin.

None of the test results showed a significant correlation with either the body temperature or total duration of fever.

III.—Changes in the electrocardiogram : Electrocardiograms in the 12 volunteers mentioned above during and after the induction of malaria showed numerous minor changes. Twenty-one days after malaria significant alteration persisted in five points. " Although most of the changes were statistically highly

significant they occurred within the so-called normal limits." Some of the changes were produced after the posture tests referred to above.

B. G. Maegraith

FALCONÍ VILLAGÓMEZ, J. A. Paludismo congenito. [**Congenital Malaria.**] *Rev. Ecuatoriana de Pediatria.* Guayaquil. 1949, Sept.–Dec., v. 1, No. 3, 155–62, 1 chart. English summary.

Account of a case in Ecuador.

TOURENC, R. Splénectomies pour rates paludéennes—à propos de 15 observations. [**Splenectomy for Malarial Spleens : 15 Observations.**] *Méd. Trop.* Marseilles. 1949, July–Aug., v. 9, No. 4, 579–84.

The author was stationed from 1939–45 at Guadeloupe, a zone where infection with *P. falciparum* is hyperendemic. During this period he performed 32 splenectomies for malarial spleens and, as a result of his experience, he considers that the indications for the operation, hitherto restricted by most surgeons to complications, such as torsion, rupture, abscess, may be considerably extended, in view of the great improvement in pre- and post-operative technique and in methods of anaesthesia. The majority of post-operative deaths are due to recrudescence of the malarial infection, and can be prevented by prophylactic pre-operative medication with the newer drugs now available. Two cases are quoted of physical under-development in patients of 18 to 20, with very large spleens and histories of frequent attacks of subtertian malaria. Splenectomy led in both cases to rapid increase in height and weight, which was not due to cure of the anaemia as this had been corrected previously by treatment. The author believes that the presence of the pathologically enlarged spleen interferes with the growth process and advises splenectomy in children of 12 to 14 with enlarged spleens and retarded growth and refractory to medical treatment. Three cases of malarial splenomegaly, hypochromic anaemia and hepatic cirrhosis are quoted, in which splenectomy checked the haematemesis and improved the general health, though in one of them the cirrhosis continued to progress. In two other cases the enlarged spleen appears to have caused menorrhagia by mechanical obstruction of the circulation ; splenectomy relieved the symptom. There were seven cases in which pain in the enlarged spleen, due to adhesions to the abdominal wall and surrounding organs, was the main indication for the operation. The author advises (1) careful preliminary treatment of the anaemia and of the malarial infection, even in subjects who have no recent history of attacks ; (2) avoidance of shock during operation and the use of the splenic blood for auto-transfusion, if stored blood is not available ; (3) closed-circuit anaesthesia with cyclopropane, or high spinal anaesthesia ; (4) post-operative treatment of the malarial infection. *W. L. Harnett*

BILLINGTON, V. L. **Side-Effects of Proguanil Therapy.** [Correspondence.] *Brit. Med. J.* 1950, Mar. 18, 671.

The writer of this letter suffered from a few attacks of subtertian malaria over the past two years and so took a course of 400 mgm. of proguanil daily for 14 days. During the first week he was awakened on three nights by a carotid sinus reflex action, involving numbness of the face or tonic spasm of the mouth. These manifestations were relieved by moving his head from the contorted position. By the ninth day, constant dizziness and a slight tingling in two fingers appeared and the drug was stopped.

The dizziness, with some headache, continued for over a week and the tingling spread to other fingers : it was increased by pressure on the median and ulnar nerves, which also caused the hand and fingers to ache. Similar, but less severe, effects were produced on the other forearm and both sciatic nerves. There was no muscular weakness, wasting or fibrillation, no sensory disturbance and the reflexes were normal. After 14 days, the symptoms had almost disappeared.

The author notes that guanidine compounds have been found to cause hypertension in animals and that hypertension may be associated with a hypersensitive carotid sinus : but when he first took his blood pressure (three days after stopping the drug) it was not significantly raised. It is suggested that the toxic effects were local.

The author concludes that proguanil must have been responsible for his symptoms and cannot therefore be regarded as completely non-toxic for man : but he admits that his course was greater than the 300 mgm. daily for ten days usually recommended and that he may himself have been sensitive to the drug. *H. J. O'D. Burke-Gaffney*

HUVÉ, P. Prophylaxie et traitement du paludisme par le diguanyl (paludrine). [**Prophylaxis and Treatment of Malaria by Diguanyl (Paludrine, Proguanil).**] *Semaine des Hôpit. de Paris.* 1949, June 26, v. 25, No. 47, 2013–17, 3 figs.

A practical review.

FAIRBAIRN, J. W. & LOU, T. C. **A Pharmacognostical Study of *Dichroa febrifuga* Lour. A Chinese Antimalarial Plant.** *J. Pharmacy & Pharmacol.* London. 1950, Mar., v. 2, No. 3, 162–77, 6 figs. [20 refs.]

LINNELL, W. H. & SHARP, L. K. **Antimalarials : Derivatives of Tetrahydroacridine.** *J. Pharmacy & Pharmacol.* London. 1950, Mar., v. 2, No. 3, 145–51.

KERMACK, W. O. & STOREY, Nora E. **Attempts to find New Antimalarials. Part XXIX. The Synthesis of various Derivatives of 2 : 3-Benz-y-carboline.** *J. Chem. Soc.* 1950, Feb., 607–12.

VINCKE, I. H. & VAN DEN BULCKE, M. A. Réaction des *Thamnomys surdaster surdaster* vis-à-vis du *Plasmodium berghei*, Vincke et Lips. [**Reaction of *Thamnomys surdaster surdaster* to *Plasmodium berghei*.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 545–8, 1 fig. on pl.

Several varieties of tree rats resembling *Thamnomys surdaster* were found in forest areas in the Belgian Congo. A proportion of these are now known to be *Praomys jacksoni*. A total of 388 rats was examined and a strain of *P. berghei* was isolated from two—from the Kisanga river (strain KBG 173) and from the Katala river (strain 453). Six other rats showed parasites but the strains were not preserved. Blood from 68 *Thamnomys* was inoculated into white mice with negative results. Unfortunately this species of rodent cannot at present be reared in captivity and wild specimens were used for testing their susceptibility to *P. berghei* ; 50 out of 92 developed the infection after one inoculation, parasites appearing in the course of the first or second week. Seven rats died of the disease between the 15th and 19th days with a massive parasitaemia. The majority, however, developed a rather light infection which lasted sometimes for as long as 39 weeks. *P. C. C. Garnham*

VINCKE, I. H. & VAN DEN BULCKE, M. A. Observations sur l'entretien de la souche K 173 du *Plasmodium berghei*, Vincke et Lips. [**Observations on the Maintenance of Strain K 173 of** *Plasmodium berghei*.] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 525–35.

A strain (K 173) of *Plasmodium berghei* was isolated from the tree rat *Thamnomys surdaster* in January 1948 and was maintained by 58 passages in white mice up to June 1949. None of the animals received any drugs, though they were vaccinated against a *Salmonella* infection. Sub-inoculations were first made subcutaneously, later intraperitoneally, twice a week, with a drop of heavily infected blood diluted in heparinized saline. The infected mice always died of the disease, usually between seven and ten days when inoculated subcutaneously, or six to seven days after intraperitoneal inoculation. Death may be delayed for a maximum of 22 days. Some mice did not become infected on the first inoculation but after four attempts, practically no mice remained refractory. Aralen (0·5 mgm. subcutaneously for three days) was the only drug which arrested the course of the disease without sterilizing the infection. Relapses always occurred and were as fatal as an untreated original infection ; they took place usually between five and nine days and, if they were treated, further relapses might follow up to a total of six. In the intervals between the relapses the blood usually remained positive on sub-inoculation.

In the organs were found parasites somewhat resembling the exo-erythrocytic forms described by SHORTT and GARNHAM [this *Bulletin*, 1948, v. 45, 762]. But the authors are careful to point out that even in the blood, parasite masses may be encountered, appearing almost devoid of pigment, with 20 blocks of chromatin, so that it is difficult to decide their actual nature particularly in organ preparations.

[In a note at the end of this number of the *Annales*, L. VAN DEN BERGHE, I. VINCKE and M. CHARDOME are reported to have discovered the tissue phase of this parasite in white mice inoculated intraperitoneally with infected blood. EE schizogony is said to occur in the fixed or wandering histiocytes of the liver and in the endothelial cells of the capillaries and histiocytes of the bone marrow. If these findings are substantiated, then EE schizogony in *P. berghei* is more like that of *P. gallinaceum* than the type found in the mammalian plasmodia.]

P. C. C. Garnham

VINCKE, I. H. & VAN DEN BULCKE, M. A. Réaction des *Rattus rattus* vis-à-vis du *Plasmodium berghei*, Vincke et Lips. [**Reaction of** *Rattus rattus* **to** *Plasmodium berghei*.] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 537–43.

The behaviour of *Plasmodium berghei* in the rat was studied with two strains of parasite (Kbg 173 and Kmna 453) inoculated intraperitoneally. In all, 94 per cent. of the rats developed heavy infections after the first inoculation, and of these about half died of the disease, usually 10 to 14 days after the inoculation. The other half underwent a natural cure, parasites rarely persisting for more than 24 days. Such cured rats remained immune to the homologous infection up to 121 days, but later some susceptibility returned, though even after a year the second strain often failed to infect the animals.

P. C. C. Garnham

RODHAIN, J. Le comportement du cotton rat vis-à-vis du *Plasmodium berghei* (Vincke et Lips). [**The Behaviour of** *Plasmodium berghei* **in the Cotton Rat.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 483–9, 2 figs. on 1 pl.

The behaviour of *Plasmodium berghei* in the cotton rat was observed by inoculating rodents intraperitoneally with blood from mice heavily infected

with the parasite. There was a mild response to the infection, a low parasitaemia appearing about a week after the inoculation, and lasting for two or three days. Splenectomy much increased the severity of the disease. The removal of spleens from cotton rats at various periods (ten days to a month) after the disappearance of parasites either caused death from a fulminating infection or gave rise to a chronic infection lasting at least four months. If splenectomy was performed before infection, all the animals subsequently developed heavy parasitaemia and died. The administration of chloroquine (1 mgm. per 10 gm. body weight, subcutaneously) was able to cure such infections if given in time. *P. C. C. Garnham*

BENNISON, B. E. & COATNEY, G. R. **Effects of X-Irradiation on *Plasmodium gallinaceum* and *Plasmodium lophurae* Infections in Young Chicks.** *J. National Malaria Soc.* 1949, Dec., v. 8, No. 4, 280–89, 5 figs.

Week-old chicks were inoculated intravenously with blood infected with (*a*) *P. gallinaceum* or (*b*) *P. lophurae*. On the same day they were exposed to single beam roentgen irradiation (400r) through two layers of cheese-cloth. The degree of parasitaemia was determined by daily counts. The irradiated chicks showed a greater density of parasites in both types of infection, than did control chicks ; this difference was better seen in birds treated with quinine and was most marked in females whose blood showed as much as a 40 per cent. difference in parasite density. It is suggested that irradiation may be of value in increasing the susceptibility of animals to species of parasites to which they are normally refractory. There is already evidence that this may occur in the case of irradiated chicks inoculated with *P. relictum*. *P. C. C. Garnham*

BISHOP, Ann & BIRKETT, Betty. **Some Observations upon Prolonged Treatment of *Plasmodium gallinaceum* Infection in Chicks with Antimalarial Drugs.** *Parasitology*. 1950, Jan., v. 40, Nos. 1/2, 149–58. [15 refs.]

Chickens infected with *P. gallinaceum* by the intravenous or intramuscular routes have been treated for long periods by catheter with doses of quinine, pamaquin (plasmoquine) and atebrin (mepacrine), based on body weight, in order to gain information on the relationship in development of erythrocytic and exoerythrocytic forms of the parasite. It was confirmed that the uninucleate blood forms described by ADLER & TCHERNOMORETZ [this *Bulletin*, 1942, v. 39, 524] which arise from exoerythrocytic forms during intense drug treatment of the host gave rise to a more rapid and intense exoerythrocytic infection than when blood from an untreated bird was used. The nature of this infection was correlated with the degree of exoerythrocytic infection obtaining in the donor bird at that time. Passage through a normal host was able to cause the infection to revert to a more normal type in which development of exoerythrocytic forms occurred later. The proportion of survivors in birds inoculated from donors showing no exoerythrocytic forms, and which were treated daily with the above drugs, was greater than in birds inoculated from hosts in which such forms were numerous. None of the latter was sterilized of their infections, whereas about 16 per cent. of the former group (no exoerythrocyctic forms in the donors) were freed of infection. That short courses of drugs given prophylactically could bring about this result is probably due to the fact that development of erythrocytic to exoerythrocytic forms was prevented. The character of the infection in birds inoculated with parasitized blood is determined by the presence or absence of exoerythrocytic forms in the inoculum [*cf.* JAMES, this *Bulletin*, 1940, v. 37, 59, and ZAIN, *ibid.*, 1942, v. 39, 26].

The earlier suggestion of ADLER & TCHERNOMORETZ [*loc. cit.*] that a more intensive development of exoerythrocytic forms was brought about by drug treatment, could not be confirmed. *J. D. Fulton*

BISHOP, Ann & MCCONNACHIE, Elspeth W. **The Stability of Paludrine-Resistance in *Plasmodium gallinaceum* in the Absence of the Drug.** *Parasitology*. 1950, Jan., v. 40, Nos. 1/2, 159–62. [15 refs.]

The paludrine-resistant strain of *P. gallinaceum* prepared by BISHOP & BIRKETT [this *Bulletin*, 1947, v. 44, 969] was previously found to retain its resistant character for some months in the absence of drug treatment, during which time it was subjected to five passages through the mosquito vector [*ibid.*, 1948, v. 45, 1066]. In the present investigation it was found that after 58 intravenous passages at intervals of two to three days over a period of 19 weeks, without being in contact with the drug, resistance was retained unaltered. At the end of 54 weeks a similar result was obtained. The degree of infection produced by the resistant strain was more variable than that produced by an untreated strain. *J. D. Fulton*

BISHOP, Ann & MCCONNACHIE, Elspeth W. **Sulphadiazine-Resistance in *Plasmodium gallinaceum* and its relation to other Antimalarial Compounds.** *Parasitology*. 1950, Jan., v. 40, Nos. 1/2, 163–74. [23 refs.]

The present investigation describes in detail the method of preparation of a strain of *P. gallinaceum* resistant to sulphadiazine previously reported by BISHOP *et al.* [this *Bulletin*, 1948, v. 45, 1066 ; 1949, v. 46, 119]. The drug was administered to chickens in gradually increasing daily doses starting with 0·625 mgm. per 20 gm. body weight, during passage every two or three days so that infection in the peripheral blood was never inhibited. Finally it was possible to give 40 mgm. of the drug daily without the parasites showing any morphological differences from the normal strain. As in the case of a paludrine-resistant strain the intensity of infection of that resistant to sulphadiazine was less whether treated with the drug or not than in the case of normal parasites which had never been in contact with the drug. This fact suggested that the powers of reproduction in the resistant parasites had been permanently affected. The interesting observation was made that exoerythrocytic forms in the sulphadiazine-resistant strain were numerous in spite of the fact that the drug inhibits the growth of these forms in the normal strain ; see TONKIN [this *Bulletin*, 1947, v. 44, 184] COGGESHALL *et al.* [*ibid.*, 1945, v. 42, 699]. The resistance therefore extends to other than erythrocytic parasites. As in the case of paludrine the resistance to sulphadiazine persisted after mosquito passage and there was a cross resistance with other sulphonamides, with paludrine and its methyl derivative but not with quinine, atebrin [mepacrine] or pamaquin [plasmoquine]. The resistance to paludrine was actually present before that to sulphadiazine, with which the strain was being treated, had developed. When a strain was being made resistant to paludrine, concomitant resistance to sulphadiazine developed but slowly. The cross-resistance between these two drugs was not considered by the authors to indicate a similar mode of action since only the sulphonamide is antagonized by *p*-aminobenzoic acid. *J. D. Fulton*

BISHOP, Ann & MCCONNACHIE, Elspeth W. **Cross-Resistance between Sulphanilamide and Paludrine (Proguanil) in a Strain of *Plasmodium gallinaceum* Resistant to Sulphanilamide.** *Parasitology*. 1950, Jan., v. 40, Nos. 1/2, 175–8.

In a further investigation of the mechanism of the cross-resistance between sulphadiazine and paludrine a strain with a low degree of resistance to

sulphanilamide was prepared by the methods previously described. It was found that cross resistance to sulphathiazole, sulphapyridine and sulphadiazine was also present to a limited degree. It should be noted that the antimalarial potency of sulphanilamide is low, while that of the other drugs is high. It was found, however, that the sulphanilamide-resistant strain was completely resistant to paludrine and this resistance developed before it was apparent for sulphadiazine. *J. D. Fulton*

TRYPANOSOMIASIS

EAST AFRICAN MED. J. 1949, Dec., v. 26, No. 12, 400–402. **Sleeping Sickness in Uganda.** (Proceedings of a Mulago Staff Clinical Meeting, 25th June, 1949) [LADKIN, R. G.; RAPER, A. B.; HENNESSEY, R. S. F.; HUTTON, P. W.; MACKICHAN, I. W.; DAVIES, J. N. P.]

Dr. LADKIN and Dr. RAPER discussed recent cases of sleeping sickness on Buvuma Island, on the Buganda bank of Lake Victoria, and elsewhere in Buganda. Distinctive features of all these cases were their sporadic incidence in country in which the density of both fly and human population was low and the fact that, unlike cases seen in an epidemic, they did not present clear-cut clinical indications of the species of trypanosome responsible. Some would be diagnosed clinically as *T. gambiense* infection, some as *T. rhodesiense*, and some indeterminate; but all could be classed as due to *T. rhodesiense* on the basis of posterior-nucleated forms appearing in sub-inoculated rats and this agreed with epidemiological evidence.

Dr. HENNESSEY said that in Uganda the main problem was animal rather than human trypanosomiasis. In connexion with the latter he referred to the proved value of concentrating populations, and of the potential value of a test such as a precipitin or skin sensitivity test, if this could be devised, for detecting early or latent infections.

Dr. HUTTON had observed the 1943 epidemic in South Busoga. Clinically the cases were undoubtedly of the severe *rhodesiense* type, and were recognized by the people themselves as being different from those of the previous *gambiense* epidemic. The present cases are milder, though still of the *rhodesiense* type. Dr. MACKICHAN [who has published a valuable account of the Busoga epidemic, see this *Bulletin*, 1945, v. 42, 13] found that cases were of the *rhodesiense* type during the height of the epidemic, but as it subsided they approached more nearly the *gambiense* type in clinical features.

Dr. DAVIES referred to American reports of impressive results in West Africa with variants of tryparsamide [possibly FRIEDHEIM's TPB, this *Bulletin*, 1949, v. 46, 711].

Dr. MACKICHAN further said "that he had found that diamidine and pentamidine drugs had no advantage over antrypol in *rhodesiense* cases, either at the start or in relapse. He had found these drugs liable to produce severe shock and possibly death, and considered they were unsafe for general use in this country." [In this connexion the present reviewer has recently remarked (*ibid.*, 916) that it is a curious gap in the study of the aromatic diamidines that, although they are now so extensively used for *T. gambiense* infections, no report has yet appeared on their action against naturally occurring *T. rhodesiense* infections. The only previous mention of any such work appears to be that of COOKSON in the Proceedings of the Intercolonial Conference on Trypanosomiasis, Lourenço Marques, 1947, vol. II, p. 52, in which he is reported to have said

" Pentamidine we have tried, and have found of little use except in very early cases, where there have been some cures, but our series has not been very large ". Publication of the details of trials of aromatic diamidines against *rhodesiense* infections in man would be useful and is long overdue.] *E. M. Lourie*

SQUIRE, F. A. **Age-Grouping of Tsetse-Flies as an Aid in the Study of their Bionomics.** *Nature.* 1950, Feb. 25, 307–8, 1 graph.

The author worked in Sierra Leone for twelve months and studied about 5,000 *G. palpalis* collected during that period. He divided them into three age groups which are based on the colour of the wing membrane and the extent to which it was frayed, and tabulated such things as the sex ratio and the proportion of unmated females in different age groups through the year. He has produced an interesting analysis in these terms of his samples of the population, a most difficult thing to do, for one cannot feel certain that the sampling is comparable at different times of the year. The paper is a somewhat condensed record of fact, and one hopes that the author will expand and discuss it at a later date. For a number of years ecologists have wanted to know whether *G. palpalis* breeds at all seasons, particularly in a rainy climate such as that of Sierra Leone. On this point the author's evidence seems clear, that breeding did occur throughout the year (though this was not confirmed by the dissection of females). Certainly young and very recently emerged flies have been found in considerable numbers even when the rivers were in flood and the " normal " breeding places were submerged. This perhaps suggests that at all times of the year a large amount of breeding may take place in spots which are at present unfamiliar to the entomologist, what we regard as " normal " being the place where the fly boy finds it easy to discover pupae.

P. A. Buxton

LEWIS, E. A. **Tsetse Flies carried by Railway Trains in Kenya Colony.** *Bull. Entom. Res.* 1950, Feb., v. 40, Pt. 4, 511–31, 2 maps & 1 fig. [14 refs.]

There are records going back as far as 1911 of the carriage of tsetse flies by trains in East Africa, and it has been realized for a long time that this is so frequent that there might be a danger of the spread of trypanosomiasis for this reason.

The present paper deals with the trains on the railway which runs from Mombasa on the coast, through a large fly belt and up into the Kenya Highlands and so to Nairobi. The species of *Glossina* which are caught on the train are *G. longipennis*, which is much the most numerous, *pallidipes* and *brevipalpis*. From the names of the species it is clear that the risk is mainly a veterinary one so that a brief notice is sufficient here.

It is clearly established not only that tsetses are carried on trains but that large numbers of them are brought in this way to places outside the normal fly area. During one year over 24,000 were actually captured on or in trains in places outside the fly belts. The largest numbers were on the outer surface or beneath goods waggons, but smaller numbers were inside the waggons and in compartments in passenger trains. It is clearly established that a large number of flies are carried into stock farming areas, and in the author's view these flies are responsible for outbreaks of animal trypanosomiasis. [This may well be the case, though it is difficult to feel quite certain of it, having regard to the existence of animal trypanosomiasis without tsetse in other parts of Eastern Africa.]

It is proposed to clear bush so as to reduce the natural foci of fly near to the railways and this will probably greatly reduce the number of flies carried by the trains. The possibility of spraying the train while it moves slowly along has also been considered. *P. A. Buxton*

i. CECCALDI, J., TRINQUIER, E., PELLISSIER, A. & ARNOULT, H. Sur l'emploi du para (2-4-Diamino-3-triazinyl-6-) arsino-oxyde par la voie intraveineuse dans le traitement de la trypanosomiase humaine. Première note : Produit employé à la dose de 3/10 mg./kg. [**Intravenous Treatment of Sleeping Sickness by 3177 RP (Melarsen Oxide). First Note : Small Doses.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 7/8, 400-407.

ii. ——, ARNOULT, H. & PELLISSIER, A. Deuxième note : Produit employé à la dose de 1 mg. 5/kg. [**Second Note : Large Doses.**] *Ibid.* 1949, v. 42, Nos. 9/10, 487–98.

i. TRINQUIER and PELLISSIER [this *Bulletin*, 1948, v. 45, 877] have already reported on the oral use of 3177 RP, which is identical with melarsen oxide. For intravenous treatment, in the present series, the course consisted of 0·1 mgm. per kgm. the first day, 0·2 mgm. per kgm. the second day and 0·3 mgm. per kgm. daily for the next five days. No patient weighed more than 51·5 kgm. Four cases were treated in the lymphatico-blood stage, three in the stage of meningeal reaction and five in the stage of meningo-encephalitis.

The treatment was well tolerated even in cases of very advanced infection. Trypanosomes disappeared from the blood and glands within 45 minutes, and symptoms rapidly subsided. Detailed case-histories are given for all the patients treated, the observation-periods ranging from three to 20 months. The authors' conclusions are that when given in the earliest stages of infection 3177 RP can sterilize the lymphatico-blood system, as observed over a period of 20 months ; but if given when there are even slight changes in the cerebrospinal fluid it seems unable to arrest further development of the disease. If it is given at a still later stage of infection the drug is more manifestly inadequate. Two of the patients were given a second similar course of treatment about two weeks after the original one, without any particular advantage. The drug does not always clear the cerebrospinal fluid of trypanosomes, for these were still seen in the fluid in one case two months after the first course of treatment and again five weeks after the second course.

In discussion, M. J. SCHNEIDER said that the doses used were insufficient and that FRIEDHEIM [this *Bulletin*, 1949, v. 46, 711] claimed very favourable results with intravenous melarsen oxide given in a dose of 1·5 mgm. per kgm. daily for seven days followed by a second similar course of injections a month after the first one. This criticism is met by the report abstracted below.

ii. Ten patients in the stage of meningo-encephalitis were treated by the regimen to which reference is made in the paragraph immediately above. Case-histories are given, in considerable detail, over an observation-period which unfortunately extends no further than three months since treatment.

In seven of the patients the treatment-course was not particularly toxic, although it usually produced albuminuria, which cleared up a week or two later. In three cases, however, there were severe toxic reactions, mainly attributable to acute nephritis. These reactions were alleviated in two patients by injections of disodium thiomalate, which enabled the full courses of treatment to be completed. The third patient, who had not received thiomalate, died four days after the first course of treatment.

The cerebrospinal fluid was much improved (including the disappearance of trypanosomes) in all the nine patients who survived, and the authors conclude

that the clearly established efficacy of 3177 RP is "fatally" limited by its toxicity, which can however be mitigated by injections of disodium thiomalate.

E. M. Lourie

FLOCH, H. & ABONNENC, E. Trypanosomes des mammifères sylvestres, autres que *S. cruzi*, en Guyane française. [**Trypanosomes other than** *T. crusi* **in Woodland Mammals in French Guiana.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 193.* 1949, June, 14 pp., 11 figs. [14 refs.]

FLOCH, H. & ABONNENC, E. Infection spontanée de la cavité générale de triatomidés par un trypanosomidé inoculable au cobaye évoluant dans le sang d'un singe et dans l'intestin des insectes vecteurs. [**Spontaneous Infection of the General Cavity of Triatomidae by a Member of the Trypanosomidae inoculable to Guineapigs and developing in the Blood of a Monkey and in the Intestine of Insect Vectors.**] *Ann. Parasit. Humaine et Comparée.* 1950, v. 25, Nos. 1/2, 15–20, 6 figs.

LEISHMANIASIS

FULTON, J. D. & JOYNER, L. P. **Studies on Protozoa. Part I. The Metabolism of Leishman-Donovan Bodies and Flagellates of** *Leishmania donovani.* *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Nov., v. 43, No. 3, 273–86, 5 figs. & 2 pls. [22 refs.]

The authors have investigated the respiratory metabolism of the tissue and flagellate forms of *Leishmania donovani.* The former were obtained from the spleen of heavily infected hamsters by emulsification of that organ, followed by differential centrifugation so that finally the parasites, practically free from accompanying tissue, were isolated. The degree of purity attained by this method is illustrated in a photomicrograph. It was demonstrated that the L.D. bodies thus isolated were infective for hamsters. The numbers used in an experiment were determined in stained preparations to which a suspension of fowl erythrocytes of known cell content had been added. Cultures of the flagellate forms were obtained under aseptic conditions from hamster spleen in a liquid medium consisting of 30 ml. of a solution (made of 1 litre 0·9 per cent. NaCl+20 ml. 1·15 per cent. KCl+2 g. glucose) to which, after autoclaving, are added 6 ml. of a mixture (made of 100 ml. rabbit serum+50 ml. ox liver extract +2 g. Bacto peptone dissolved in 10 ml. distilled water+40 ml. haemoglobin solution). The *p*H was adjusted to 8·0–8·2, after which the medium was passed through a Seitz filter. In this medium cultures were subsequently maintained by serial passage every six to eight days, but not for more than 25 subcultures, and it was shown by intraperitoneal inoculation of hamsters at intervals that they retained their infectivity for the original host. A growth curve for flagellates maintained at 25°C. was constructed; a lag phase up to the fourth day was followed by a period of active growth and multiplication with a peak in numbers, determined by means of a Thoma counting chamber, between the 10th and 14th days. Different morphological types were encountered as growth proceeded, and *p*H changes in the medium were followed. Flagellates from young cultures were more active metabolically than those from older cultures and experiments were therefore never made with forms not more than 10 days old. The oxygen uptakes, respiratory quotients and substrates oxidized by both forms of the parasite were investigated as well as the degree of respiratory inhibition produced by substances such as cyanide, azide and iodoacetate and by drugs known to be clinically active against the disease

including diamidines and antimonials. It was found that flagellates depend to a considerable extent on carbohydrate sources for maintenance of respiratory activity, and in its absence respiration falls off gradually. The rate of consumption of glucose and oxygen approximated to that of *Plasmodium knowlesi* but was much smaller than that for *Trypanosoma rhodesiense* [this *Bulletin*, 1938, v. 35, 709]. Leishman-Donovan bodies exhibited a much less intense metabolism than flagellates, but oxygen and glucose were used and carbon dioxide was evolved. Differences were encountered in the degree of respiratory inhibition produced by various reagents on the two forms of the parasite. From experimental data it was concluded that inhibition of respiration had definite limitations in indicating leishmanicidal activity of drugs. Succinic acid appeared to be the main metabolic product formed by flagellates. *C. A. Hoare*

WALTERS, J. H. **A Case of Indigenous Kala-Azar in the Gambia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Nov., v. 43, No. 3, 287–92, 2 pls.

The patient had always lived in Gunjur, a coastal town in the Gambia, only leaving it to make occasional visits to Bathurst.

He had suffered from an irregular fever (100°–102°F.) for some time and had an enlarged spleen (six fingers' breadth) and liver (four fingers' breadth) ; he showed a leucopenia (2,500 per cmm.) and a moderate orthochromic normocytic anaemia. There was no response to antimalarial treatment or to iron.

A formol-gel test was positive and a splenic puncture showed leishmania.

Neostam was first given, a total of 0·575 grammes in six intramuscular injections, but this drug caused a severe toxic reaction and was abandoned. A course of ten intravenous injections of stilbamidine isethionate (total= 0·675 gramme) was then given. The patient made a rapid clinical recovery and after three weeks a splenic puncture showed no leishmania. However, the enlargement of the liver and spleen persisted (four fingers' breadth). The white-cell count rose to 4,650 per cmm. after the antimony injections and to 21,000 after the stilbamidine. (There is no record of any follow-up examination.)

A liver biopsy before treatment showed Kupffer cells grossly enlarged and packed with leishmania. Histiocytes in the portal spaces were similarly packed with parasites and the author states that " the liver parenchyma itself had been invaded ". [This is a most unusual observation.] There was a considerable degree of fibrous hyperplasia and some fatty changes in the liver cells. Three months later, the parasites had disappeared and the Kupffer cells were normal in size, but dense lymphocytic infiltrations in the portal spaces and fibrous infiltration in the portal tracts persisted ; there were, however, no fatty deposits in the liver cells. The author concluded that the eventual return of the liver to normal size was unlikely.

The author discusses the possible sources of infection. He concludes with the suggestion that " the disease is endemic in a zone bordering the Sahara and extending from the Sudan to the West Coast." *L. E. Napier*

ROMAÑA, C. & ABALOS, J. W. Distribución de flebotomos y leishmaniosis tegumentaria en la Argentina. [**Distribution of** *Phlebotomus* **and Cutaneous Leishmaniasis in the Argentine.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1949, Aug., v. 2, No. 3, 293–302, 4 figs. [15 refs.] English summary (7 lines).

POUL, J. Diagnostic de la leishmaniose générale canine par la recherche des leishmania dans le mucus nasal et dans le testicule. [**Diagnosis of Generalized Leishmaniasis in Dogs by Identification of Leishmaniae in the Nasal Mucus and the Testes.**] *Arch. Inst. Pasteur d'Algérie.* 1949, Dec., v. 27, No. 4, 315–16.

FEVERS OF THE TYPHUS GROUP

BELLER, K. & BAUER, K. Vorkommen und Bedeutung von Rickettsien auf den Lidbindehäuten von Tieren. [**The Origin and Significance of Rickettsiae in the Palpebral Conjunctiva of Animals.**] *Zent. f. Bakt.* I. Abt. Orig. 1949, Mar. 25, v. 153, Nos. 6/7, 174–7, 3 figs.

NYKA, W. **Rickettsiae in the Blood of Mice and Rats infected experimentally with Typhus.** *J. Infect. Dis.* 1950, Jan.–Feb., v. 86, No. 1, 81–7, 7 figs.

The author found it possible to detect rickettsiae in blood films of mice and rats which had been inoculated intranasally and intraperitoneally with murine and classical typhus infection. The findings were very variable ; rickettsiae were seen in the blood of 31 out of 47 mice inoculated by the intranasal route with murine strains, but in only 19 out of 92 rats infected in the same way. The organisms were seen in all the 24 mice inoculated in the same way with classical rickettsiae.

The numbers seen in the films varied from very scanty to numerous ; good photomicrographs illustrate the appearance of the organisms.

In a study of films from typhus patients the author has found organisms " which, by their size, morphology and position in the blood were very suggestive of rickettsiae ". The photographs support this suggestion and also the suggestion that RICKETTS and WILDER in 1910 may really have seen the rickettsiae which they described as the causative organisms of typhus fever. *John W. D. Megaw*

PFEIFFER, D. H. **Louse- and Flea-borne Typhus. Cerebrospinal Fluid Findings and the Response to Aureomycin and Chloromycetin.** *South African Med. J.* 1950, Feb. 18, v. 24, No. 7, 111–14.

The author describes ten cases of fevers of the typhus group admitted to the Bloemfontein Isolation Hospital during September and October 1949, when there was a " wave of epidemic typhus fever in the Orange Free State ".

Out of six cases investigated by the complement-fixation test, four reacted about four times more strongly with murine than with epidemic antigen and the other two reacted eight times more strongly with epidemic than with murine antigen. Three other patients were tested only with the rickettsia-agglutination reaction ; these patients were brothers ; one of them gave the epidemic type of reaction, the other two reacted equally with murine and epidemic rickettsiae.

The author states that " according to these tests both flea-borne and louse-borne cases occurred in the same epidemic ".

[There is nothing to show that the epidemiology of the two types of cases differed in any way, so there is room for speculation as to whether it was more likely that flea-borne and louse-borne cases were occurring simultaneously in the same epidemic or that the serological tests were not infallible.]

Aureomycin was given to four patients and chloromycetin to two others, with the usual good results, but the cost at the time of writing (October 1949) was said to be about £3 to £4 for a course of 16 capsules of 0·25 gm. each.

John W. D. Megaw

KUWATA, T., BERGE, T. O. & PHILIP, C. B. **A New Species of Japanese Larval Mite from a New Focus of Tsutsugamushi Disease in Southeastern Honshu, Japan.** *J. Parasitology.* 1950, Feb., v. 36, No. 1, 80–83, 4 figs.

" *Trombicula* (*Leptotrombidium*) *fuji* n. sp. of larval field-mouse mite from a new endemic focus of tsutsugamushi disease on slopes of Mt. Fuji, Japan, is

described. Holotype in U.S. National Museum No. 1863. Standard measurements of larvae of *T. intermedia* and *T. scutellaris* are also provided. All three species belong in the ' tsutsugamushi group ' of mites."

See also p. 566, JONES, **A Method for Studying the Distribution and Bionomics of Trombiculid Mites (Acarina : Trombidiidae).**

BERTRAND-FONTAINE, SCHNEIDER, J. & RIVRON, J. Premier cas de "Q. fever" (maladie de Derrick-Burnet) observé à Paris. [**The First Case of Q Fever observed in Paris.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 32/33, 1432–7. [20 refs.]

Although this case was studied in Paris the infection was believed to have been contracted in Perpignan in the extreme south of France. The patient was attacked in November, 1949. The diagnosis was based on the clinical picture together with a strongly positive rickettsia-agglutination reaction at a titre which rose to 1–640 about five weeks after the onset, having been 1–320 a week earlier and zero at the end of the first week.

The source of infection was not discovered. *John W. D. Megaw*

FONSECA, F., PINTO, M. R., DE AZEVEDO, J. F. & LACERDA, M. T. Febre Q em Portugal. História : Observações clinicas : Diagnóstico. [**Q Fever in Portugal. History, Clinical Observations, Diagnosis.**] Reprinted from *Clínica Contemporanea.* 1949, Jan., Feb. & Mar., v. 3, Nos. 21, 22 & 23, 1159–64 ; 1218–27 ; 1257–71, 25 figs. (1 coloured).

——, ——, ——, AMARO, F. C. & LACERDA, M. T. Febre Q em Portugal. Diagnóstico diferencial. [**Differential Diagnosis.**] *Ibid.* Apr., v. 3, No. 24, 1315–29, 18 figs.

——, ——, GANDER, G., DE AZEVEDO, J. F. & LACERDA, M. T. Febre Q em Portugal. Doença experimental em alguns dos animais de laboratório. [**The Disease in various Laboratory Animals.**] *Ibid.* July, v. 3, No. 27, 1511–16, 7 figs.

——, ——, OLIVEIRA, J., DA GAMA, M. M. & LACERDA, M. T. Febre Q em Portugal. A doença experimental no homem. [**The Disease caused by Inoculation of Human Beings.**] *Ibid.* Oct., v. 3, No. 28, 1567–78, 9 figs.

——, NUNES, M. A., PINTO, M. R. & LACERDA, M. T. Febre Q em Portugal. Infecção experimental do macaco. [**Experimental Infection of Macacus Apes.**] *Ibid.* Nov., v. 3, No. 29, 1640–44, 2 graphs & 3 figs.

In this series of five papers Fonseca and eight other workers describe a detailed study of various aspects of Q fever [not Q(ueensland) fever as stated in the article but Q(uery) fever].

The first two papers contain a detailed description of 20 cases of the disease seen in Lisbon between the end of December 1947 and May 1948. These papers also give a good general description of the history and clinical aspects of the disease, and they are well illustrated by a series of X-ray photographs and temperature charts. Details are given of the isolation from the patients' blood of *Rickettsia burneti* by guineapig inoculation, and of the different laboratory methods of diagnosis.

The paper dealing with differential diagnosis is more complete than any known to the reviewer. Among complement-fixation tests carried out on 20 healthy persons and 178 patients suffering from various other diseases the only

reactions were three, at a titre of 1–10, out of 65 patients having atypical pneumonia, and one, at the same titre, out of two patients having infectious mononucleosis. Among the 20 cases of Q fever three were negative ; one in repeated tests on the 37th, 62nd and 165th days, the other two in single tests on the 8th and 33rd day, respectively. All the rest were positive at titres ranging from 1–20 to 1–640. In six of the seven cases tested on or before the 17th day the titres were 1–20 to 1–40. The highest titres (1–320 to 1–640) occurred in tests carried out on the 42nd, 55th, 69th and 70th days. In two cases tested on the 113th and 119th days the titre was 1–20.

In the third paper a description is given of a study of the disease in experimental guineapigs and mice.

The fourth paper deals with the experimental inoculation of 45 mental patients with suspensions of spleens of infected guineapigs or yolk-sac cultures. The patients were divided into so many groups and the conditions of inoculation of the members of each group were so varied that a summary of the results is not easy to give, but generally speaking no apparent illness was caused by ingestion or intranasal inoculation of the infective material ; intradermal inoculation caused a local reaction and sometimes slight general symptoms, especially with yolk-sac material. The naturally occurring disease was closely simulated when subcutaneous injections of yolk-sac material were given.

Complement-fixation tests were carried out before, and at intervals after, inoculation. Occasional slight reactions occurred after nasal inoculation and in most cases of intradermal inoculation titres of 1–20 to 1–160 were reached at some stage. After ingestion the responses were almost consistently negative.

In the fifth paper there is a description of the disease produced experimentally in Macacus apes (*Cercopithecus aethiops sabaeus* Lin.). Intraperitoneal inoculation with infected guineapig spleen suspension was followed by a febrile attack lasting six to seven days in the two monkeys inoculated in this way, but both of the animals continued to take their food and showed no other signs of illness. Blood of one of them caused a typical thermal reaction in a guineapig inoculated intraperitoneally.

Two other monkeys were inoculated intraperitoneally with a yolk-sac culture and one of them was also given an intratracheal injection of the same culture. Both reacted with a rapidly rising temperature and both were sacrificed, one on the fifth and the other on the sixth day of the illness. A detailed description is given of the changes observed in the organs on histological examination. The outstanding features were hyperplasia of the reticular cells and the replacement of the lymphocytes by plasma cells ; these changes were most readily observed in the lungs, spleen, and lymph glands.

John W. D. Megaw

DE PRADA, J., GAY, B. & LLORENTE, A. Primer caso de fiebre " Q " humana en España. [**The First Human Case of Q Fever in Spain.**] *Med. Colonial.* Madrid. 1950, Feb. 1, v. 15, No. 2, 131–5. English summary (8 lines).

One of the authors [DE PRADA, this *Bulletin*, 1950, v. 47, 460] has already mentioned the isolation of *Coxiella* [*Rickettsia*] *burneti* from human patients.

The present case occurred in May 1949 ; the patient, aged 41, was the wife of a shepherd ; about a fortnight before the onset she had removed ten ticks from her body.

The diagnosis was confirmed by the recovery of *C. burneti* from inoculated guineapigs and by complement-fixation and rickettsia-agglutination tests.

In the summary it is stated that this is " one among various cases found among human beings in Salamanca ".

It is stated that *C. burneti* has been isolated by Dr. G. CLAVERO *et al.* from *Rhipicephalus sanguineus* and *R. bursa* found on animals in the Madrid slaughter house, and that one of the authors has found Q fever infection in *Hyalomma excavatum* in Salamanca. *John W. D. Megaw*

BEEMAN, E. A. **Q Fever—An Epidemiological Note.** *Pub. Health Rep.* Wash. 1950, Jan. 20, v. 65, No. 3, 88–92. [30 refs.]

The two cases of Q fever described in this paper are of special interest. Patient A, a housewife, was attacked on 14th November, 1948; she had been engaged in looking after the room and bed linen of a lodger who was employed in the preparation of Q fever antigens at the Laboratory of Infectious Diseases, National Institutes of Health, where seven workers were attacked by Q fever between 10th October and 22nd November, 1948, though the lodger himself had not been ill.

When patient A was removed to hospital her husband undertook the work of looking after the lodger and he in turn was attacked on 15th December.

It was suspected that infection must have been conveyed by the clothing, shoes, hands, or hair of the lodger, and the moral pointed by the author is that "adequate coverings completely protecting all parts of the body not only should be worn but should be completely changed before leaving the laboratory, and all exposed body surfaces should be thoroughly cleansed".

John W. D. Megaw

CAMINOPETROS, J. La broncho-pneumonie épidémique hiverno-printanière, humaine et animale (chèvre, mouton), fièvre Q ou grippe des Balkans, à *Rickettsia burneti* var. *caprina*, les caractères particuliers de l'infection animale. [**Epidemic Hiberno-Vernal Bronchopneumonia or Q Fever or Balkan Grippe in Man and Animals (Goats and Sheep) caused by** *Rickettsia burneti* **var.** *caprina*. **The Special Characteristics of the Infection in Animals.**] *Ann. Inst. Pasteur.* 1949, Dec., v. 77, No. 6, 750–56, 3 figs. [21 refs.]

From a study of experimental and natural infection of goats and sheep with Q fever the author concludes that the rickettsiae of the disease in these animals is a distinct variety which he proposes to call *Rickettsia burneti* var. *caprina*.

This conclusion is based on (1) the low titres of the complement-fixation reaction in infected goats and sheep as compared with the high titres found among infected human beings and guineapigs, (2) the transmission of infection in Greece and Asia Minor is primarily from sheep and goats to man through milk and secondarily from man to man by infected droplets of sputum. These features of the disease are regarded as contrasting with Q fever infection in Australia and America where the tick is the vector and infection by cow's milk plays a secondary part.

[No mention is made of comparative studies of the effects produced in experimental animals by the author's variety of rickettsia and strains from other parts of the world.] *John W. D. Megaw*

MOOSER, H., MARTI, H. R. & LEEMANN, A. Beobachtungen an Fünftagefieber. (2 Mitteilung.) Hautläsionen nach kutaner und intrakutaner Inokulation mit Rickettsia quintana. [**Observations on Trench Fever. Skin Lesions after Cutaneous and Intracutaneous Inoculations with** *Rickettsia quintana*.] *Schweiz. Ztschr. f. Path. u. Bakt.* 1949, v. 12, No. 5, 476–83, 8 figs.

In this interesting paper the authors describe the lesions produced in the skin of rabbits and human beings by inoculation with suspensions of the intestines of lice infected with *Rickettsia quintana*.

After intracutaneous inoculation of rabbits a hyperaemic papule with central necrosis was produced within four days ; this gradually became resolved and by the end of three weeks only a slight thickening of the skin remained.

After rubbing the infected faeces into the scarified skin of rabbits there was no inflammatory reaction, but the same procedure applied to susceptible human beings caused a pale-red, slightly raised, lesion which persisted till the end of the attack of trench fever resulting from the inoculation.

Intracutaneous inoculations into the skin of a susceptible volunteer caused an attack of fever in which irregular paroxysms occurred between the 8th and 23rd days after inoculation ; on the 10th day a small pale-red papule appeared at the site of inoculation ; this gradually increased in size till the 20th day when it was 12 mm. in diameter and consisted of a haemorrhagic pustule on the surface of which a dried crust soon formed and persisted till the end of the sixth week. A month after the end of the fever this person was again inoculated intracutaneously ; the only result was the formation of a small red papule at the site ; there was no general reaction.

Similar intracutaneous inoculations were given on two occasions to a person who had undergone an experimental attack of trench fever three years previously ; the only result on each occasion was the appearance of a small papule which did not become necrotic and which disappeared quickly.

The local lesions of susceptible persons differed from those of immunized persons in the same way as the lesions of primary cowpox inoculation differ from those of secondary inoculation. *John W. D. Megaw*

RABIES

Remlinger, P. Propagación de la rabia por la rata. [**Transmission of Rabies by Rats.**] *Med. Colonial.* Madrid. 1950, Mar. 1, v. 15, No. 3, 173–7.

Remlinger, P. & Bailly, J. Unification des vaccinations antirabiques humaine et vétérinaire. [**A Single Antirabic Vaccine for Human and Veterinary Use.**] *Bull. Acad. Nat. Méd.* 1950, v. 134, Nos. 3/4, 91–2.

Of the various methods of antirabic vaccination in use, which give almost identical results, that of Fermi is mostly employed today : phenolized vaccines have, among other advantages, the property of being readily transported so that vaccination may be begun even in fairly remote places on the day on which the vaccine is asked for.

Antirabic vaccination of animals, either prophylactic or curative, is being undertaken increasingly and indeed in some countries the vaccination of dogs is compulsory. The authors give detailed figures of 56,553 animals which have received antirabic vaccine in the Pasteur Institute at Tangier up to January 1950. The failures " could be counted on the fingers of one hand ".

The phenolized vaccine used for human purposes is the same as the veterinary vaccine—a 5 per cent. emulsion of rabid brain in 1 per cent. phenol-saline, attenuated by 24 hours' incubation at 37°C. After satisfactory sterility and non-pathogenicity tests, it is put up in 5 cc. ampules for individual human courses of one injection daily for 15 to 25 days or flasks of 20 cc. for vaccination of several people at one time. For animals, the vaccine is only put up in 20 cc. flasks, as the quantities required are variable. This procedure has advantages for the patients and at the same time simplifies the work of the Institute.

H. J. O'D. Burke-Gaffney

VAZ, E. Proteção do homem contra a raiva. Dados sucintos da situação do problema no Brasil sob o aspecio social. [**Protection of Man against Rabies. The Social Aspect of the Problem in Brazil.**] *Folha Med.* 1949, Oct. 25, v. 30, No. 20, 157–61. [11 refs.]

A general statement of rabies in Brazil between 1930 and 1937 and a list of three closely printed columns is given of the places where treatment posts have been set up.

MCINTYRE, H. D. & KROUSE, H. **Guillain-Barré Syndrome complicating Antirabies Inoculation.** *Arch. Neurology & Psychiatry.* 1949, Dec., v. 62, No. 6, 802–8. [Refs. in footnotes.]

The Guillain-Barré syndrome, consisting of polyneuritis with frequent involvement of the facial nerve and a discrepancy between high protein levels and a low number of cells in the cerebrospinal fluid, has been observed in four patients who had just finished a course of antirabic treatment. Following the description of these cases, the possible causes of neurologic accidents are listed and discussed :—

(1) Street virus attenuated by vaccination.
(2) Insufficiently killed fixed virus.
(3) Foreign protein rendered toxic through treatment with detergents.
(4) Allergy against normal components of the white brain matter combined perhaps with a previous general allergic disposition.

An interesting point is raised with regard to the uneven distribution of such paralytic accidents. The occurrence of six of such cases in one doctor's practice gives rise to two speculations :—

(1) Traces of oily substances remaining in syringes may act as a non-specific stimulating factor as oils have been found to act experimentally.
(2) The technique of vaccine injection which was used by that particular physician was unorthodox, in so far as he injected the vaccine into the deltoid region and the buttock instead of the abdomen. *C. R. Klimt*

PLAGUE

DEVIGNAT, R. Epidémiologie de la peste au Lac Albert 1944–1945–1946. [**Epidemiology of Plague in the Lake Albert Region, 1944 to 1946.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Sept. 30, v. 29, No. 3, 277–305, 4 graphs & 1 fig. [25 refs.]

The author describes a novel method of studying the epidemiology of plague. He estimates the "common index of transmissibility" for each of the nine various modes of transmission which are believed to occur. In eight of these modes the flea is the vector and transmission occurs between wild animals, domestic rats, and man in the different possible combinations to which the following names are given: (1) Inter-sylvatic, (2) Sylvatic-domestic, (3) Domestic-sylvatic, (4) Inter-domestic, (5) Human-sylvatic, (6) Sylvatic-human, (7) Human-domestic, and (8) Domestic-human. The ninth method is called inter-human ; the name applies to pneumonic plague.

The estimation of the index of transmissibility is made with the help of elaborate mathematical formulae which are likely to deter the uninitiated. It may be doubted whether the factors concerned can suitably be dealt with by mathematical methods.

Those interested must consult the original paper. *John W. D. Megaw*

FERGUSON, A. L. **The Practical Application of Plague Control with special reference to the Orange Free State and Griqualand West.** *Pub. Health.* Johannesburg. 1950, Jan., v. 14, No. 1, 5–10.

The author has succeeded in presenting the essentials of plague control in a surprisingly brief space. The historical background of the subject is briefly as follows :—In the Union of South Africa during the 30 years 1920–1949, there have been 1,005 separate outbreaks of plague in which there were 2,361 cases, most of which were fatal; 790 of the outbreaks and 1,670 of the cases occurred in the Free State and Griqualand West, where epizootics among wild rodents and sporadic outbreaks among human beings may still occur almost everywhere. Nearly all the outbreaks have occurred in rural areas and practically all have originated among multimammate mice or gerbils.

There is little to criticize in the paper, but exception must be taken to the statement that *Pasteurella pestis* was first isolated and identified " by two Japanese scientists Drs. Yersin and Kitasato ". The bacillus described by Kitasato differed in several essential respects from *P. pestis* ; and Yersin who first described the bacillus was not Japanese but Swiss.

Another statement may convey a dangerously wrong impression, it is that pneumonic plague is apparently transmitted only by " close contact in a close ill-ventilated space—for several hours " ; there have been so many cases in which medical men have been infected after a brief visit to a patient that droplet infection must be regarded as a grave risk, though strangely enough after a few successive transfers from man to man the infectivity of the disease seems to fall so that outbreaks are usually self-limited.

The description of the control measures carried out in the Free State carries special authority because of the striking success that has followed the persistent application of the prescribed methods of prevention. A notable feature of the campaign has been the willing co-operation of the general public (especially the farmers) with the official administrative organization.

The paper should be read by everyone who is concerned in any way with the prevention of plague.

John W. D. Megaw

WANSON, M. & CAMPHYN, R. Propriétes raticides du D.D.T. [**DDT as a Rat Poison.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 549–55.

The authors in Léopoldville found that a dose of 60 mgm. of Neocide Geigy, containing 50 per cent. of DDT, was lethal for most rats weighing about 100 gm. A few rats were highly resistant and were not killed by doses three times larger than the above. Gerbils were much more sensitive to the poison than rats.

Nearly 200 rats were compelled to traverse a distance of 20 centimetres of a surface covered with 50 per cent. DDT powder ; 93 per cent. of the rats died within two days. Ten gerbils exposed to the same conditions died within 12 hours. The quantity of powder applied is not stated ; presumably it was a thick layer.

Dusting the runs and holes of black rats in storehouses with Gèsarol (50 per cent. DDT), applied once, established complete rat control which was maintained for at least four weeks.

Dusting the entrances of the burrows of Gerbils caused a remarkably prompt destruction of the animals.

Care must be taken to avoid risk to domestic animals and human beings.

John W. D. Megaw

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

ELSDON-DEW, R. **Amoebiasis in Natal.** [Correspondence.] *South African Med. J.* 1950, Mar. 4, v. 24, No. 9, 160.

The author, who is Honorary Director of the Amoebiasis Research Unit established in Durban by the Council for Scientific and Industrial Research, visited Lourenço Marques at the invitation of the Government of the Colony of Moçambique. He found no amoebiasis comparable in incidence or severity to that seen in Natal. For example, of 121 stool specimens from Africans in hospital in Lourenço Marques, he found the incidence of *Entamoeba histolytica* and *E. coli* to be 2 and 28 per cent. compared with 28 and 9 per cent. respectively in Durban Africans—almost a reversal of the figures.

The author speculates on this different incidence. Lourenço Marques is rather more " tropical " than Durban and he also observed a similar apparent absence of fulminating amoebic dysentery during the war in such towns further up the coast as Dar-es-Salaam or Mombasa.

The soil in Lourenço Marques is sandier than that in the comparable African area in Durban, so that amoebic cysts would be less likely to survive there : flies were not greatly prevalent during the author's visit to Lourenço Marques (this was attributed to extensive DDT operations). The peri-urban Bantu live in ill-defined areas and there is an absence of a sharp dividing line between them and those occupied by Europeans : there is also more space around the houses.

A point made by the author is that the dietary habits of the indigenous people differ considerably from those of the Natal Zulu, particularly in that the Africans of Lourenço Marques eat fish and therefore have an adequate supply of protein : the cereal and vegetable diet is also much more varied than in Durban. [In an Editorial in the same issue of the *Journal*, it is pointed out that proteins are protective against many diseases and this may also apply to amoebiasis.]

While the helminthic parasites which penetrate the skin were found more frequently in Lourenço Marques (as might be expected in flatter country with soil moist for longer periods), it is striking that *Ascaris* was much less common there (21 per cent. compared with 38 per cent. in Durban). The author points out that entamoebae and *Ascaris* infections are acquired by ingestion of fairly recently passed dejecta and this factor is partly an index to the facial contamination of food.

No *E. histolytica* and only 5 *E. coli* were found in stools of 40 Europeans in Lourenço Marques : no comparable figures are given for Durban.

The editorial quoted above also speculates on possible reasons for the high incidence of amoebic dysentery in Durban : the establishment of the Amoebiasis Research Unit is clearly an admirable step. *H. J. O'D. Burke-Gaffney*

BRADIN, J. L., Jr. & HANSEN, E. L. **Indirect *in vitro* Action of Antibiotics in Comparison with Activity of Accepted Amebacides.** *Amer. J. Trop. Med.* 1950, Jan., v. 30, No. 1, 27–41, 7 figs. [18 refs.]

For the successful culture of *E. histolytica* the presence of at least one actively growing bacterial species is required. The part played by the latter is not quite clear and may depend on several factors including the provision of some necessary growth substance, a condition of anaerobiosis or suitable oxidation-reduction potential. In order to find if amoebicidal action was effected *in vitro* directly or indirectly by certain substances the following conditions of test were employed. A saline, buffered, monophasic medium (apart from rice

starch) was put up in two series of tubes containing the required dilution of drug to be tested. One series was sealed with paraffin to preserve anaerobiosis and the other was plugged with cotton wool in the usual way. After culture at 37°C. for 48 hours, in presence of organism "t", each tube was examined for the presence of live amoebae and confirmation, when necessary, was obtained by subculture in the case of the plugged tubes. Electrode potentials of the cultures were also determined. It was concluded that the action of a number of well-known antibiotics was indirect on the amoebae as evidenced by the fact that the series of paraffin-sealed tubes required a higher concentration of drug to bring about death of the amoebae. Streptomycin and two other antibiotics seemed also to exert a direct action, as well as indirect, on the amoebae. When "accepted amoebacides" including emetine were tested as above there was no difference in the end-point obtained in the two series of tubes and this fact suggested that the action of these substances on the amoebae was direct. Potentiometric data with the different agents also indicated the part they played against bacteria. [The elegant test described by DOBELL, this *Bulletin*, 1948, v. 45, 518, was directed to the same end.] *J. D. Fulton*

CATTAN, R. Formes cliniques et traitement de l'amibiase intestinale chronique. [**Clinical Forms and Treatment of Chronic Intestinal Amoebiasis.**] *Semaine des Hôpit. de Paris*. 1949, June 26, v. 25, No. 47, 2027–31.

A general discussion.

DELL'AQUILA, A. Amebiasi polmonare sinistra a sindrome pseudotubercolare. [**Pulmonary Amoebiasis simulating Tuberculosis.**] *Acta Med. Italica*. 1949, Dec., v. 4, No. 12, 315–17, 3 figs. [15 refs.] English summary (7 lines).

See also p. 562, LEHMANN & KAYSER, **Stomach Function in Post-Dysenteric Debility.**

SOULAGE, J. & PORTE, L. Conessine et phenergan. Observation clinique. [**Conessine and Phenergan : Clinical Observations.**] *Méd. Trop.* Marseilles. 1949, Nov.–Dec., v. 9, No. 6, 1059–60.

Disturbance of sleep is the commonest toxic manifestation met with during treatment with conessine hydrochloride. The authors therefore studied the efficacy in this connexion of phenergan which is a synthetic antihistaminic credited with marked hypnotic properties.

Among 27 patients treated with conessine, they found that 22 could tolerate full treatment up to a total of 3·5 to 5·4 gm. (according to body weight), and yet maintain normal sleep, when they received a single dragee of phenergan, 25 mgm. with their evening meal. In the other five cases, slight disturbances of sleep made it necessary to give two dragees—one with the evening meal and one an hour afterwards : in this way it was possible to push conessine up from otherwise low to adequate doses.

The authors found phenergan to be superior in correcting sleeplessness to some of the other recognized products, *e.g.*, gardenal, vitamin PP, neo-antergen. It did not, however, appear to affect other side-effects of conessine such as trembling of the extremities.

With the new salt, conessine hydrobromide, disturbances of sleep—although less frequent and appearing after stronger doses—were also amenable to treatment with phenergan, and examples of this are given.

H. J. O'D. Burke-Gaffney

BRUMMER, P. 2-phtalylsulfanilaminothiazol vid balantidiasis. [**2-Phthalylsulfanilaminothiazole in Balantidiasis.**] *Nordisk Med.* 1950, Mar. 3, v. 43, No. 9, 383–4.

The English summary appended to the paper is as follows :—

" The writer has treated three cases of balantidiasis with 2-phthalylsulfanilaminothiazole. In the course of 4 to 5 days the diarrhoea completely subsided and the Bal. coli disappeared from the feces in each case. In two cases healing remained permanent. In the third case, however, the treatment was discontinued too soon and there was a recurrence after about two weeks. But this case also healed when the treatment was repeated."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

DUBOIS, A. Note complémentaire sur les souches de *Borrelia duttoni* au Ruanda. [**Additional Note on Strains of** *Spirochaeta duttoni* **in Ruanda.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 455–6.

The following is a translation of the author's summary :—

Within a radius of some kilometres, we observed the multiplicity of strains of *Sp. duttoni*, established by immunity tests in mice.

[See also this *Bulletin*, 1949, v. 46, 836]. *H. J. O'D. Burke-Gaffney*

CHARTERS, A. D. **Tick-borne Relapsing Fever in Somaliland with special reference to the Blood Sedimentation Rate.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Jan., v. 43, No. 4, 427–34. [15 refs.]

This paper was compiled from investigations in Somaliland during the years 1941 to 1945, and it is noted that the tick-borne relapsing fever in Somaliland is far less severe than the louse-borne infection in Abyssinia. There were no fatalities in the 42 patients treated, the series including 4 Europeans, 31 Somalis and 7 East Africans. Eight lumbar punctures were performed, 5 of these showing increased protein in the cerebrospinal fluid and one a cobweb clot on standing. No spirochaetes were found in films of the fluid. The disease was definitely more severe in Europeans.

Complications included : iritis in 3 patients ; basal pneumonia in 2, dysentery of the bacillary type in 2 ; diarrhoea in 3 ; acute nephritis, hepatitis with jaundice, and unilateral otitis media in one each. One case of Jacksonian epilepsy in a Somali was seen, but unfortunately the diagnosis was not confirmed by blood examination.

In 8 patients examined the Kahn test was negative. Out of 26 leucocyte counts performed during the attack the average was 7,795 per cmm. A neutrophilia was the exception rather than the rule, but there was commonly a secondary anaemia.

The blood sedimentation rate was specially investigated. Westergren's technique was used, and 159 examinations were made—113 on Somalis, 19 on Europeans and 27 on East Africans. The blood sedimentation rate taken during the attacks varied from 4 to 110 mm., the average of 19 examinations being 61·7 mm. in one hour. Examinations were made at intervals for several weeks after the last attack of pyrexia. There was a tendency for the rate to diminish after the 4th week and an interesting feature of this test was the sudden and marked variations in the sedimentation rate without any

corresponding rise of temperature or change in the patient's clinical condition. One patient showed a rise of from 22 to 90 mm. during the 3 weeks after his last attack, despite the fact that he was feeling perfectly well.

Estimations were also made before relapses in order to find out whether there was any tendency for a rise to occur as the next relapse became imminent; no such tendency was noted. The author was tempted, after studying the blood sedimentation figures, which may remain raised for weeks after all symptoms have subsided, to conclude that even after all clinical signs have disappeared, there still remains a latent infection in the body. It would appear that the spirochaete of relapsing fever resembles that of syphilis in its property of remaining dormant for long periods without causing symptoms. Another feature in common is the neurotropic character and the tendency to cause latent infections of the nervous system.

Intravenous neosalvarsan did appear to cause benefit in some localities while in others it had no effect at all. It is suggested that some strains had become arsenic-resistant. Penicillin was administered to two patients (both Europeans) in a dosage of 15,000 units every 3 hours for 6 days and the general impression was that, in the doses given, it was ineffective in preventing relapses. Arguing from experiments in animals the curative dose would be about 25,000,000 units for a man of 60 kgm. One patient did, however, appear to obtain symptomatic benefit.

The author considers that streptomycin holds out more hope of success. One Somali with iritis improved within 24 hours after local instillation of penicillin (2,000 units per cc.) into the conjunctival sac every 2 hours.

C. F. Shelton

KAUL, S. **Relapsing Fever—Tick-borne. Account of an Outbreak in J. & K. Force, India.** *Indian Med. Gaz.* 1949, Oct., v. 84, No. 10, 433–40, 5 figs. (1 on pl.)

A description of an outbreak of tick-borne relapsing fever occurring among troops in the Jammu and Kashmir area. Of the 108 cases diagnosed as clinically typical, only 58 were positive on blood examination (thick films) after thorough examination and 32 per cent. of these showed the organism for the first time only during a remission. Descriptions are taken only from those cases positive to blood examination and with a history of tick bite.

A feature of the outbreak was that in nearly every case those attacked had occupied local huts or shelters made of timber taken from the remains of them, evidence showing that the enemy, including Pathans, had occupied the infective sites. The ticks did not seem to be imported in bedding or equipment. Fifty per cent. of patients had an incubation period of 7 to 12 days and 75 per cent. had one of 5 to 13 days. Immediately after the affected persons were bitten the bites began to itch and within a few hours a small papule with a tiny vesicle on top appeared; this was usually scratched off and left a minute ulcer. In a few days the papules reached the size of a lentil and became dark and pigmented with a shiny surface and scaly margin, later becoming lichenified and deeply pigmented. With one exception, in all undoubted cases itching was the first and most prominent symptom.

Fever was the chief manifestation; only 15 patients came under observation during the initial fever but from the case records it appeared that in 33 per cent. the onset was slow, in 42 per cent. sudden and in 25 per cent. sudden and accompanied by a rigor. In the large majority of patients the temperature was irregular, being at times intermittent and at times remittent.

Muscular pains were a feature, severe pains in the small of the back and in the neck muscles being characteristic, but there were no other clinical signs of

meningeal or cerebrospinal involvement. Giddiness was an almost constant feature, headache was not conspicuous and varied with the severity of the fever. Prostration was well marked. The spleen was enlarged in most cases while the liver was palpable in 40 patients and tender in the majority of these. Wassermann and Kahn tests were performed in 39 instances and were negative in 37, one specimen being positive for both tests. One patient developed acute iritis, two had pain and effusion in the knee and elbow respectively, and one had a severe visceral involvement, probably of the pancreas. There were no deaths.

Penicillin was given to one series of 8 patients in an initial dose of 50,000 units followed by 30,000 units every 3 hours for 16 injections (intramuscularly). Another series of 7 patients received an initial dose of 200,000 units, followed by 100,000 units every 3 hours for 16 doses; this antibiotic apparently had no effect, 13 of the 15 cases relapsing. A third series of 8 patients received 1·5 gm. of N.A.B. starting with a dose of 0·15 gm. intravenously, followed by two more of 0·45 gm. each at intervals of 4 days. [This adds up to only 1·05 gm.] Blood films in all cases were examined daily until it was thought that a relapse was unlikely. Patients were put on one or the other scheme of treatment by turns as they were diagnosed, irrespective of the severity of the symptoms. This could only be done during a certain period as before and after, owing to various difficulties, all patients were treated with N.A.B. Of all patients, totalling 50, treated with N.A.B. only, one had a relapse requiring another injection of 0·45 gm. N.A.B. after completion of the standard course, while all those relapsing after penicillin responded to a course of the N.A.B. Prolonged courses of penicillin were not given [the author's figures, especially as to the amount of N.A.B. given are not always clear, and his disappointing results from penicillin are not borne out by some other observers, see, for example, this *Bulletin*, 1946, v. 43, 445, 447].

The author states that, so far as he knows, this is the first report of tick-borne relapsing fever occurring in India, but cases of this type of the disease are said to occur in the tribal territory of the North-West Frontier, and it is probable that it was brought in by raiders from this area. *C. F. Shelton*

GILCHRIST, W. S. **Aureomycin and Relapsing Fever.** [Correspondence.] *Lancet.* 1950, Mar. 18, 515.

The author, in Angola, Portuguese West Africa, treated 8 Africans suffering from microscopically confirmed *Trep. duttoni* infections with aureomycin by the mouth. The patients were aged 2 to 25 years and four of them were between 2 and 14. All were acutely ill at the time of diagnosis. The average initial leucocyte count was 16,000 per cmm. with pronounced neutrophilia in five patients whose differential counts were followed up.

The average dose of aureomycin given was 0·5 gm. every 6 hours for 6 doses. In four cases, the blood became free of treponemata after one dose and in the other four after two doses. In four the temperature rose after the first dose, but in all cases it fell to normal in 6 to 14 hours (average 10).

In the five patients having repeated differential counts, there was a rise of monocytes (initially 11 per cent.) to 14 per cent. after treatment had begun: in three of them there was a well-marked rise in monocytes and the count was still 14 per cent. 8 to 10 hours after the beginning of treatment. It is stated that many of these monocytes had a distinctive appearance, which is being studied.

Apart from the initial rise of temperature and rigors in a few cases, the relief of symptoms and fall of temperature were dramatic.

H. J. O'D. Burke-Gaffney

HEISCH, R. B. **A Case of Rat-Bite Fever in Kenya Colony, and the Discovery of Rodents naturally infected with** *Spirillum minus* **(Carter).** *J. Trop. Med. & Hyg.* 1950, Feb., v. 53, No. 2, 33–9, 3 figs. [18 refs.]

Only three cases of rat-bite fever have been recorded in East Africa, two from Kenya and one from Tanganyika. To these the author adds another seen in an adult African who had been bitten on the back of his left hand by a rat 16 days previously. *Spirillum minus* was isolated from the patient's blood and inoculated into guineapigs with successful results.

Spirilla were found in rats caught in Nairobi and in the Coast Province of the Colony, which proved to be pathogenic to man and could be recovered by sub-inoculating the subject's blood into laboratory animals. As many as 7 of 44 rats (*Rattus rattus kijabius*) from the coast were found infected and it is remarkable that human infections have not been recorded from there. Spirilla were not found in rats caught in Kisumu in the great lake districts.

An interesting feature of the human infection in Nairobi was the enlargement of the supraclavicular lymph nodes, the axillary nodes being unaffected.

The naturally occurring human infection and those produced by spirilla from rodents were easily controlled and relapses prevented by treatment with N.A.B. or penicillin.

[In the Tanganyika case also the axillary lymph nodes were unaffected though the right middle finger was bitten. The right supracondylar nodes were enlarged and tender and remain palpable to this day—21 years later.]

P. A. Clearkin

CURBELO HERNANDEZ, A. Las fiebres por mordeduras de rata. Infección espirilar (Sodoku), infección bacilar y fiebre de Haverhill. Estudio de Conjunto. [**Rat-Bite Fevers. Sodoku and Haverhill Fever.**] *Archivos Hospital Universitario.* 1949, Nov.–Dec., v. 1, No. 6, 529–58, 15 figs. on 8 pls. [38 refs.] English summary [7 lines).

A general survey.

LEPROSY

LAMPE, P. H. J. & BOENJAMIN, R. **Social Intercourse with Lepers and the Subsequent Development of Manifest Leprosy.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1949, Dec., v. 1, No. 4, 289–346, 1 chart & 5 diagrams.

This long and important paper deals with an immense amount of Batavian data on the development of leprosy in those who have had social intercourse with sufferers from leprosy. The first chapter deals with the infections that arose in 500 households infected with leprosy, with note of the duration of contact in years, among the 2,421 companions in whom 136 new cases arose. The morbidity rate was only 0·7 per cent. after long contact with a tuberculoid case against 4·8 per cent. in respect of contact with a lepromatous case and the average duration of contact with the first case was 5·1 and 6·1 respectively. The "annual" morbidity rate was from 0·1 per cent. to 0·3 per cent. Contact with outside leprosy patients was also investigated, which was found to have a definite influence with special reference to lepromatous cases, but this was not demonstrated with regard to contact with outside tuberculoid cases. The conclusion is reached that the danger of house exposure to contact with a

leprosy case can be established with certainty in the case of the lepromatous cases, but not in the tuberculoid ones.

Households containing a lepromatous case, but with no outside contacts, were next dealt with, and bed contacts were especially noted. It was found that the morbidity rate of bed contacts was 29 per cent. against 4 per cent. without such bed contact ; a point of great significance and in conformity with some previous inquiries. Table VI gives data regarding different periods of bed contacts which bring out the significant fact that an extraordinary high morbidity rate is associated with a previous bed contact with a lepromatous case, if begun at an age of approximately 0–14 years of age ; commencement of contact at birth makes no difference. There is no significant variation of the rates of the two sexes. An advanced clinical stage of the primary case increases the danger to the housemates.

Another chapter deals with the origin of infection in an unselected group of 612 cases in 500 unselected households infected with leprosy to determine the spread of the disease outside such households on which any general spread is dependent. Here again the decisive factor was contact with a lepromatous case. An " outside " intercourse with a lepromatous patient was found to have taken place in 59·3 per cent. of an unselected group of leprosy patients and in 27·0 per cent. in a similar group of persons without leprosy ; a significant difference. Such previous contact was ascertained in 420 out of 612 patients. In 108 with " outside " contact, other than with housemates or home contact, a multiplicity of contacts was often found. Many other points of less importance are also dealt with and further data are given in a number of tables in the appendices of this comprehensive study. *L. Rogers*

LARA, C. B. **Leprosy in Infancy and Childhood.** *Monthly Bull. Bureau of Health.* Manila. 1948, Mar.–Apr., v. 24, No. 2, 61–89, 5 figs. on 2 pls. [28 refs.]

This paper summarizes 30 years' work on children at Culion, Philippines ; it should be read by all leprologists as it is long and detailed. It records a high rate of infection of children born to leprous parents and morbidity rates of 50 per cent. up to the age of five years. Infection occurs after a few months of contact with their infected parents and symptoms may arise years after separation from them. Exposure to infection for one or two years in infancy yields about as high an incidence as after much longer periods. The evidence indicates that bacteriologically negative parents may infect their children, but to less extent then positive ones. The absence of the disease in adjacent living children of healthy employees supports the improbability of indirect infection through insects, etc., and emphasizes the rôle of direct contact with the infected parents. Reported observations suggest that repeated injection of young children with sterilized leprous materials has a protective effect. Very careful descriptions of the earliest skin lesions are given and initial well-defined flat macules, first described at Culion, are established as being significant. The location of the earliest lesions is on parts of the body coming most in contact with the parents and *vice versa.* A large proportion of the lesions clear up without treatment, amounting to 65 per cent. disappearing without relapse in from 1 to 13 years, although 52·7 per cent. of all initial cases were bacteriologically positive. The infections appear to be due mainly to mothers carrying very young children during infancy. Fifty-seven autopsies on children under two years of age with early lesions showed no bacilli in the internal organs. Separation of infants from their parents is thus indicated, but has not been found to be practicable at Culion. Two plates illustrate early lesions, which are fully described. *L. Rogers*

NUÑEZ ANDRADE, R. Hanseniasis en la infancia en Mexico. Lo que de ella interesa al pediatra mexicano y cómo debe manejarla. [**Leprosy among Children in Mexico. Its Importance in Mexican Paediatrics and Modes of dealing with it.**] *Medicina.* Mexico. 1949, Dec. 10, v. 29, No. 593, 464–75. English summary.

The fact must be borne in mind that leprosy is endemic in Mexico. A list of 32 districts is given showing a total of 9,510 cases of the disease between 1930 and September 1949, but in half of these districts the number is under 100. In four the numbers are high: Jalisco with 1,893; Guanajuato with 1,676; Distrito Federal 1,334; Michoacan 1,246. Next comes Sinaloa, but some way behind, with 836. [The populations of these districts are not mentioned so the degree of prevalence cannot be stated.] There were 1,142 under 14 years of age; 35 under 4 years, 93 between 5 and 9 years and 1,014 between 10 and 14 years. Living in the same rooms (*pieza*) were 6,822 contacts.

A study of, or inquiry into, the primary lesions in children showed that the commonest early signs were papulo-urticarial, papular nodules, or small slightly raised maculae of a pink or purple colour; rarer types were those of anaesthetic multiple maculae, reddish and slightly raised, seen mainly in older children. The sites most often involved were the face, upper arms, shoulders, gluteus and thighs. The lesions persisted, alternately increasing and decreasing, for long periods of time. Some 10 per cent. would present relapses or recurrence one to three years after apparent cure. Anaesthetic patches are hard to prove in the very young who cannot co-operate, and are mostly found when incision or scraping to obtain material for smears is submitted to without complaint or sign of pain.

There are a score or so of dispensaries for treatment of patients in the Republic; the drugs most commonly used are promin, diasone, sulphetrone and chaulmoogra derivatives. Notification is compulsory and the lepromatous and open infectious cases should be isolated. Any suspected should be sent to a dermatologist or to the Medical Officer of Health for confirmation or otherwise. The establishment of more small centres is recommended for zones where the incidence seems to be increasing, and contacts should be visited periodically for early detection of lesions. *H. Harold Scott*

GONZALEZ PRENDES, M. A. Epidemiologia y profilaxis de la lepra en Pinar del Rio. [**Epidemiology and Prophylaxis of Leprosy in Pinar del Rio.**] *Rev. Sifilografia, Leprologia y Dermatologia.* Marianao, Cuba. 1949, May, June, July & Aug., v. 6, No. 2, 57–79, 1 map & 1 plan. [35 refs.]

In the Pinar del Rio Province of Cuba there are said to be 89 leprosy patients; 26 in the San Lázaro Hospital, 2 in the San Luis de Jagua sanatorium and 61 ambulatory patients. It is with the last that this paper is concerned.

At the 1943 census the population was 398,794. In three of the 15 municipalities there are no known cases; Artemisa has 15, Pinar del Rio municipality 13. Of the total population 52 per cent. are males, 48 per cent. are females; 39 of the ambulatory patients are males and 22 are females; 51 are whites 8 are half-castes and 2 are negroes. There are no patients under 15 years of age, 2 are between 15 and 20 years, and the figures for subsequent decades are 11, 18, 14, 9 and 7; thus 43 of the 61 are in the 3rd, 4th and 5th decades. Thirty-four are of the lepromatous types, 16 tuberculoid, 6 non-characteristic, and 5 were unclassified. There are 211 persons cohabiting with the 61 patients and "more than 60 per cent. of these are in circumstances where they are in constant danger of infection." Thirty-eight of the 61 are receiving adequate dispensary treatment, 17 are known to be going untreated; as regards the remaining 6 there is no relevant information.

There is little to add as regards prophylaxis. The standard of living of 40 of them is very poor ; it is naturally desirable to isolate the highly infective, at the same time rules should not be so stringent that patients and their relatives and friends are led to hide the infection. Notification must be obligatory ; children should be properly cared for and the people educated in respect of the disease and its dangers. [See also this *Bulletin*, 1946, v. 43, 563, 933 ; 1949, v. 46, 842]. *H. Harold Scott*

MANALANG, C. **The Transmission of Leprosy.** *Monthly Bull. Bureau of Health* Manila. 1948, Mar.–Apr., v. 24, No. 2, 91–6, 3 pls. [11 refs.]

After some quotations from old writers the author points out that the Japanese religious custom of shaving the heads of babies at the age of 100 days exposes them to infection of the scalp which is common among them and so rare in other races where such removal of the protective hair is not done. This amounts to a large-scale experiment that supports the view that the ordinary mode of infection is through the skin, as a result of frequent and prolonged contact, and supports the author's view that infections of leprosy as a rule only take place during infancy. *L. Rogers*

NOLASCO, J. O. & LARA, C. B. **Histology of Clinically Healed " Primary " Lesions of Leprosy in Children of Lepers. II. Their Clinical Progression and Final Resolution into Healed Scars. Report of Thirteen Cases.** *Monthly Bull. Bureau of Health.* Manila. 1948, Mar.–Apr., v. 24, No. 2, 97–128, 16 figs. on 6 pls. [11 refs.]

This is a careful study of " primary " leprous lesions which cleared up without treatment in young children ; histological records are given. It shows that the resistant power of young children is often sufficient to clear up in time bacteriologically positive early lesions, often single and primary ones. The principle data of thirteen cases are tabulated, the last being of special interest owing to number of microscopical examinations made. By the fourth and fifth month the bacteriological content had been reduced from the high rate of 4+ to 1+ with coincident clinical recession. Some other cases showed less rapid improvement. The scars in recovered cases showed only scar tissue with none of the characters of leprous lesions. In eleven cases followed up, the maximum development was found in an average of 6·7 months and resolution took place between the 5th and 20th months with an average of 10·3 months, and in eight cases followed up the original lesions had become healed scars in an average of 18·1 months. A high degree of individual resistance was thus demonstrated in very young children of under three years of age. Furthermore, 12 of the 13 children, now 7 to 12 years old, had continued to live with their leprous parents without showing any active signs of the disease. Their resistance was also shown by strong lepromin reactions, which may preclude reinfection. *L. Rogers*

ARNOLD, H. L., Jr. **" Macules " of Leprosy.** *Arch. Dermat. & Syph.* 1949, Dec., v. 60, No. 6, 1148–57, 1 diagram. [Refs. in footnotes.]

This is a careful description of macules in the wide sense of the term, with the following conclusions. Both flat and elevated macules apparently represent acquired allergic hypersensitivity to the nucleoprotein of *Myco. leprae*, but if this is inadequate to destroy the organisms a lepromatous macule results and can be identified by the abundant bacilli it contains. If the organisms are destroyed the occurrence of nerve damage is recognizable and the relatively

favourable nerve form of leprosy results or the maculo-anaesthetic or tuberculoid form appears. On the other hand hypersensitivity usually results in spontaneous cure, but it may be lost. *L. Rogers*

JOHANSEN, F. A., ERICKSON, P. T. & ROSS, Hilary. **The Diagnosis of Leprosy.** *Trop. Med. News.* 1949. Suppl., 24 pp.

This is a useful pamphlet written to facilitate the diagnosis of leprosy by practitioners in most of the United States in which cases only rarely occur; it is well adapted for this purpose. All stages are described but stress is rightly laid on the earlier symptoms, the recognition of which will facilitate the efficient treatment by modern methods. The epidemiology and distribution in the United States is first dealt with on the usual lines, as is the classification and the methods of detecting anaesthesia and of bacteriological examination by the cut and scraping method. The early signs are clearly described as well as lepra reactions and their significance. In the differentiation the points distinguishing it from syphilis, with failure of specific treatment to clear up the lesions, and from sarcoid, ringworm, acne, lupus, syringomyelia and Raynaud's disease are noted. The article well serves its purpose. *L. Rogers*

DE AGUIAR PUPO, J. Evolução da Leprose. [**Evolution of Leprosy.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 157–74, 9 figs.

The author lays stress on the fact that, though there are two main types of leprosy, the lepromatous and the tuberculoid, the third so-called type, indeterminate or undifferentiated, may evolve in the direction of one or the other of the two main types, in the character of the lesions, the change in the Mitsuda reaction and the presence and number of Hansen's bacilli. He reproduces photographs illustrating these differences and forms of tables for recording them. *H. Harold Scott*

DE SOUZA LIMA, L. Conceito atual de reação leprotica. [**Present Views on the Lepra Reaction.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 151–6.

The author discusses the lepra reaction which, in his view, differs in the different types of the disease. His argument is somewhat involved, but may be summed up thus: In either the tuberculoid or lepromatous type the reaction may occur suddenly in the slow course of a chronic disease, or as an early, initial manifestation, or a sudden intensification of a leprotic process till then latent. It is evidenced by exacerbation of existing specific lesions and the appearance of fresh lesions of the same kind and the general state deteriorates. But in the polymorphous form—the erythema nodosum type of the lepromatous form, as the author calls it—the reaction may be an intercalary or an initial circumstance, but the pre-existing lesions are not exacerbated; they remain quiescent and erythematous patches, nodosum or polymorphic in character, appear and the general condition is not aggravated but, on the contrary, seems to improve. *H. Harold Scott*

RHEINBOLDT, H., BERTI, F. A., PEREGO, C., RIECKMANN, B. H. G., RZEPPA, H. W., MAURI, A. C., HADLER, W. A. & DE SOUZA LIMA, L. Quimioterapia da lepra: estudos químicos, experimentais e terapêutico-clínicos. Nota prévia. [**The Chemotherapy of Leprosy. Chemical, Experimental and Clinical Studies.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 135–45.

This is a preliminary note, the first of a proposed series of contributions to gather information on the problems of prophylaxis and treatment of leprosy. The present paper indicates the plan to be followed of dividing the whole question into three parts: 1, *Chemical*, on the composition of compounds used and pointing out the ideas to be pursued in the synthesis of other drugs to be tried. 2. *Experimental*, recording the results of tests of the drugs on laboratory animals. 3. *Clinical* trials of the drugs in human cases.

In the first, about a dozen sulphonic derivatives are mentioned, with references to the literature from the early years of the present century when the series first began to be prepared. Five are derivatives of 4,4′-diaminodiphenyl sulphone. In the second part, altogether 18 drugs are listed in a table and animal trials were carried out on mice and also the effects on Stefansky's bacillus noted. In this table the average daily dose in mgm., the dose per kilogramme body-weight, the mode of administration (8 orally, 7 peritoneally, and 3 by both routes) are given; the effect on the evolution of the lesions is stated in general terms, as nil, very slight, obvious (*apparente*) with inhibition in some of the lesions, changes in the bacilli (no change, or granulation), the tolerance of the drug in the doses given, the results on the blood state and the general condition, the anaemia produced (and cyanosis and diarrhoea in some instances) and the effects on the bone marrow (hypoplastic in two instances where this is mentioned).

In the clinical section, the basic drug mentioned was started in June, 1948, on 46 "moderate and advanced cases" of the lepromatous form. It was given in doses of 0·3 gm. daily, in 0·1 gm. tablets with food, for three weeks, followed by a week's rest. The first course produced marked anaemia, but subsequent courses were well tolerated. The formaldehyde bisulphite of sodium compound, $AMBS_1$, was given intravenously to 16 lepromatous patients; the drug was of a strength of 5 gm. in 12 cc. and the initial dose was 1 cc., gradually increased to 12 cc. in a series of 15 days, then 7 days' rest. It was well tolerated. In 9 others, 3 of whom were in an early stage, the drug was given *per os* in 1 gm. dragées daily with food, for 6 weeks, followed by a drug-free interval of 2 weeks. In this form also tolerance was excellent. The clinical results will be reported later, after a longer trial.

Para-aminosalicylic acid was started on 1st December 1948, with 10 lepromatous patients, 3 with pulmonary tuberculosis also. The dosage was 10–12 gm. daily in tablets of 0·5 gm., for weeks, followed by 3 weeks without it. Tolerance was excellent; up to the present it seems to be less effectual than the sulphones. Other compounds are to be studied and are to be reported upon later. *H. Harold Scott*

FLOCH, H. & DESTOMBES, P. Traitement de la lèpre par la diamino-diphényl-sulfone (1358 F). [**Treatment of Leprosy with Diamino-Diphenyl Sulphone.**] *Bull. Acad. Nat. Méd.* 1949, v. 133, Nos. 29/30, 568–71.

This short paper deals with three years' trial of the mother sulphone in French Guiana. The preparation was given either orally in a dose gradually increased from 40 to 50 mgm. daily up to 200 mgm. (divided into three doses) each day, which was well borne, with rest on one day a week and a week after

every two months. The blood and urine were examined daily and any bacteriological changes observed in the skin lesions and the nasal mucous membranes. A total of 101 cases of leprosy (52 lepromatous, 23 indifferent and 26 tuberculoid) have been treated since November 1948. Benefit was observed in all types, but especially in lepromatous cases. Of 35 lepromatous cases treated orally for three to seven months 26, or 74 per cent. improved and only 1 became worse, but by intramuscular use of the drug 10 of 11 improved: these results are at least as good as with the more costly promin and diasone and sulphetrone. The mucous membranes first showed improvement and nodules may also show spectacular benefit. In trophic cases oedema and ulcers yielded first and the general condition of the patients is also ameliorated. Some degree of anaemia, yielding to iron, was the main complication. The microscopical changes noted were also similar to those which follow the commonly used sulphones. Some clinical and bacteriological improvement may result within two months. *L. Rogers*

LAVIRON, P., LAURET, L. & SCHNEIDER, J. Résultats d'un an d'essais de traitement de la lèpre à l'Institut Marchoux de Bamako, par un sulfone: le p-di (aminophényl) di (γ-phényl N-propylamino) phényltétrasulfonate de sodium (3.668 R.P. ou Cimédone). [**Treatment of Leprosy with *p*-di(aminophenyl) di (γ-phenyl N-propylamino-phenyltetrasulphone of Sodium) (3668 RP or Cimédone).**] Reprinted from *Bull. Soc. Française Dermat. et Syph.* 1949, v. 56, No. 2, 181–6.

This sulphone [equivalent to sulphetrone] is reported to be little toxic and very active and a trial in leprosy is recorded, together with a table giving the details of 12 cases out of 27 treated in 1948 at the Institute Marchoux, Bamako. Daily intravenous injections were given in 16 cases in doses of 5 cc. daily gradually increasing to 15 cc., but 7 patients had to interrupt the treatment on account of sclerosis of veins and other manifestations. Oral use was better borne, with rapid improvement without notable difficulties. In 10 lepromatous and 2 tuberculoid cases doses of 1 gm. daily gradually raised to 5 gm. produced progressive improvement as shown in the table in the text: a maximum daily dose of 3 gm. usually sufficed. Sickness is prevented by a solution of bicarbonate of soda. Anaemia is slight and easily controlled. In 5 cases reactions followed by regression of symptoms were noted, during which treatment was stopped and antimony given. The retrogression of symptoms was similar to that after other sulphones. A notable diminution, but not complete elimination, of lepra bacilli was always found, together with morphological changes. The results were thus very promising. *L. Rogers*

BASSET, A., SCHNEIDER, J. & BALLE, M. Essai de traitement de la lèpre par le 3.668 R.P. (p-di (aminophényl) di (γ-phényl N-propylamino) phényltétrasulfonate de sodium) au Pavillon de Malte de l'Hôpital Saint-Louis. [**The Treatment of Leprosy with 3668 R.P. in the Saint Louis Hospital.**] Reprinted from *Bull. Soc. Française Dermat. et Syph.* 1949, v. 56, No. 2, 188–94.

This paper records a trial of 3.668 R.P. [equivalent to Sulphetrone] in the treatment of leprosy. In comparatively small doses for a sulphone, good results have been obtained without toxic effects. Details are given of five out of 20 cases and the following results noted, which are very encouraging. Improvement was noted after six weeks to six months with healing of ulcers and drying up of nasal and laryngeal secretions. Circumscribed lepromes

necrosed and healed in some cases. In nerve forms the influence of the drug was slight and pain seemed to be exacerbated. The rarity of undesirable reactions is attributed to the small doses used. These results are comparable with those obtained with other sulphones. *L. Rogers*

JOHANSEN, F. A., ERICKSON, P. T., WOLCOTT, Rolla, R., MEYER, W. H., GRAY, H. H., PREJEAN, B. M. & ROSS, Hilary. **Promacetin in Treatment of Leprosy. Progress Report.** *Pub. Health Rep.* Wash. 1950, Feb. 17, v. 65, No. 7, 195–207, 2 figs.

In the search for the best sulphone for leprosy the authors report on a trial of promacetin. This is reported to be of relatively low toxicity as it does not break down into the more toxic diaminophenyl sulphone, so that massive doses orally do not give dangerous blood levels. Evidence of its use since 1943 at Carville shows anti-leprotic properties on oral administration in comparatively small doses. It is a 4,4:-diaminodiphenylsulphone-2 acetylsulphonamide. It has been tried in 26 lepromatous and 1 tuberculoid case ; most of the patients were moderately advanced or unfavourably far advanced. Seventeen had no previous treatment, but six had much improved under prolonged treatment, yet were still positive for lepra bacilli. The results are tabulated and photographs of some show the improvement obtained. The initial doses were from 0·3 to 0·5 gm. daily, gradually raised to a maximum of 3 to 4 gm. No severe acute toxic signs were noted nor did drug fever occur : none of the manifestations required suspension of treatment and any slight tendency to anaemia was easily controlled. Of 21 patients with active symptoms, treated for four to 16 months with an average of 658 gm., the usual good effects of sulphone treatment were noted, including steady shrinking of nodules, healing of ulcers and rapid clearing up of lesions of mucous membranes. The tuberculoid case improved rapidly. Reduction of the bacilli in skin smears did not become evident until after a year's treatment. The group with residual lesions showed surprisingly rapid clearing up of skin lesions. Many active cases showed loss of bacilli from mucous membranes after one year. The results are therefore very promising. *L. Rogers*

FLOCH, H. & DESTOMBES, P. Manifestations cutanées et nerveuses de type réactionnel constatées au cours du traitement sulfoné de la lèpre. [**Cutaneous and Nervous Reactions during Sulphone Treatment of Leprosy.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 192.* 1949, May, 10 pp.

After references to earlier literature on the subject the authors give their own experience of reactions during sulphone treatment in the form of observations on nine cases. In the last of these, febrile reactions lasted two months in spite of cessation of the treatment. The reactions were of a variable nature, and appeared after from one and a half months' to two years' injection of promin, and after from 8 to 15 months with diasone. They varied from cutaneous and lymphatic exacerbations to general febrile symptoms. It is pointed out that they occurred in from 50 to 61 per cent. of different series of cases reported by other authors. As far as possible they ought not to lead to cessation of the treatment unless the reactions are very important as for example in febrile and ocular forms, for mild reactions may be followed by improvement. *L. Rogers*

GENÚ, J. O. A. & DE OLIVEIRA LIMA, S. Ensaio da rongalita no tratamento da lépra. [**Trial of Rongalita in the Treatment of Leprosy.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 187–90.

Rongalita, or metanalsulphoxylate of sodium, is said to be devoid of toxicity, closely allied structurally to diasone, to be cheap, easily purified and readily obtainable. The authors have made trial of it in 5 cases of the lepromatous form of the disease. In 3 the bacilli were present in the nasal mucus, in 4 in the skin ; in one with negative skin the nasal mucus was positive ; Mitsuda reaction was negative in all five. The drug was administered in the following way : A 1 in 10 solution was prepared in distilled water ; 10 cc. were given intravenously the first day, 20 cc. on the second, 30 cc. in two injections of 15 cc. on the third, 40 cc. on the fourth and 50 cc. on the fifth day and after, in two injections daily. The course was 30 days, followed by 15 days' rest. A second course started with 50 cc. in two doses intravenously and lasted for 30 days. One patient had a leprous reaction the second day and his treatment was suspended for three weeks ; another asked for promin to be substituted. The others did not show any improvement and one, whose nasal mucus had been negative, became strongly positive.

To sum up : Each patient receiving the complete courses had a total of 3,000 cc. (300 gm. of the drug) of the solution ; the drug seemed, it is true, to be non-toxic, but there was no beneficial effect, though improvement followed its substitution by the sulphones. The author's results, in other words, did not confirm the benefit reported from the use of the drug in the Argentine. [See also this *Bulletin*, 1949, v. 46, 944.] *H. Harold Scott*

GENÚ, J. O. A., DE OLIVEIRA LIMA, S. & SANTOS, M. A bota de unna no tratamento das úlceras lepróticas. [**Unna's Boot in the Treatment of Leprotic Ulcer (of the Foot).**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 191–4.

This seems to be merely another example of " cure by local rest." Eighteen women and 22 men with leprotic ulcers [presumably perforating ulcers of the sole] were treated by the Unna boot, which checks the oedema and chances of secondary infection and trauma. It would appear that after 8 days the smell resulting from " organic decomposition " is almost intolerable, though it can be masked by deodorants or materials " of a sweet-smelling savour." After another week this malodour diminishes and the boot is worn for 2 months altogether.

Of 179 ulcers so treated 100 healed and cicatrized firmly ; 50 others improved greatly and it is thought that further application of the boot will cure these also ; 15 remained unaffected and 14 became worse. The method has the advantage that patients can get about and do their work. *H. Harold Scott*

FLOCH, H. & DESTOMBES, P. La vitaminothérapie D2 à hautes doses (traitement de Charpy) dans les formes tuberculoïdes et indifférenciées de la lèpre. [**Large Doses of Vitamin D2 (Charpy's Treatment) in Tuberculoid and " Indifferent " Forms of Leprosy.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 195.* 1949, Aug., 5 pp.

Large doses of vitamin D2 have been tried in " indifferent " and tuberculoid cases of leprosy with very variable and uncertain results, cases being either stationary, worse or better in each series, for the details of which the paper should be referred to. Nevertheless the authors consider that further trials are indicated. *L. Rogers*

BOENJAMIN, R. **Surgical Treatment of the Primary Lesion of Leprosy.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 217–28, 3 figs. on pl. [15 refs.]

MUIR, E. **Leprosy and Industry.** *Proc. Soc. for Study Indust. Med.* Jamshedpur, India. 1949, Sept., v. 1, No. 3, 102–6.

In this note the author explains in simple language the epidemiological reasons for the recommendations he gives for controlling the spread of leprosy among industrial employees. The lepromatous cases of a fairly advanced type, with discharge of large numbers of lepra bacilli from the nose and ulcerated nodules, are a serious danger to others. The patients should be given an agreed period of leave prior to their services being dispensed with. The nerve and tuberculoid cases, which in India constitute 75 to 80 per cent. of the whole, should be given six or more months leave as required while being treated by modern methods to clear up their lesions. They can be differentiated by giving positive lepromin reactions, whereas the dangerous infective lepromatous cases give negative reactions. Surveys are necessary and treatment of nerve and tuberculoid and early lepromatous cases should be undertaken at clinics under a trained medical staff. These measures will suffice to deal with the problem. *L. Rogers*

HELMINTHIASIS

ENIGK, K. Tierische Helminthiasen. [**The Helminth Diseases of Animals.**] *Zent. f. Bakt.* 1. Abt. Orig. 1949, v. 154, 127*–38*.

GOLDMAN, M. & JOHNSON, Sadie A. **Deep-Freeze Preservation of Stool Specimens containing Intestinal Parasites.** [Research Notes.] *J. Parasitology.* 1950, Feb., v. 36, No. 1, 88.

Fifty-seven stools containing cysts of amoebae and *Giardia intestinalis* and 18 stools containing helminth eggs were frozen in a deep-freeze locker and kept for 10 days to 3½ months before re-examination.

Macroscopically, the thawed stools resembled the freshly passed specimens, but microscopically cysts and eggs were reduced in numbers and often distorted.

It was concluded that deep-freezing of stools was not a satisfactory method for preserving cysts and eggs for direct or flotation methods of examination.

H. J. O'D. Burke-Gaffney

STANDEN, O. D. **Experimental Schistosomiasis. II. Maintenance of *Schistosoma mansoni* in the Laboratory, with some notes on Experimental Infection with *S. haematobium*.** *Ann. Trop. Med. & Parasit.* 1949, Dec., v. 43, Nos. 3/4, 268–83, 3 figs. [13 refs.]

"1. The establishment of *Schistosoma mansoni* as a standard laboratory infection is described. Attempts to establish *S. haematobium* failed.

"2. The superiority of *Australorbis glabratus* over *Planorbis boissyi* as the snail vector for an Egyptian strain of *S. mansoni* is demonstrated.

"3. The infection of mice by cutaneous penetration of cercariae results in 100 per cent. of the animals becoming infected, but the range in worm burden is from one to 84. An average of 21 per cent. of cercariae employed develop to maturity, but the greatest frequency of worm burden is approximately 12 per cent. of the cercariae employed.

"4. The sex distribution of worms is found to be 60 per cent. males and 40 per cent. females.

"5. The majority of paired worms migrate to the mesenteric veins, but some remain in the portal vein. Unpaired males normally remain in the liver and in the portal vein.

"6. The mouse proves to be the most suitable animal for screening-tests, and a method of autopsy is described."

MALDONADO, J. F., ACOSTA MATIENZO, Josefina & THILLET, C. J. **Biological Studies on the Miracidium of** *Schistosoma mansoni*, **Part 2. Behavior of the Unhatched Miracidium in Undiluted Stools under Diverse Environmental Conditions.** *Puerto Rico J. Pub. Health & Trop. Med.* 1949, Dec., v. 25, No. 2, 153–74. [Spanish version 175–99.]

"(a) *S. mansoni* eggs are rather short-lived. It seems that in undiluted stools, under favorable tropical conditions of temperature, their maximal life span rarely exceeds eight days, with an average span of four or five.

"(b) The hatchability of surviving eggs decreases with the advancing age of the stool at about the same rate as the viability, but the infectivity (as determined by the ability of the miracidium to penetrate into the snail host) remains practically unchanged or is only slightly reduced.

"(c) Laboratory conditions at room temperature are not ideal for their survival in undiluted stools.

"(d) Survival in stools deposited in the shady outdoors is greatly affected by weather conditions. Alternating fair and rainy weather is most favorable to survival, but prolonged dry weather is as unfavorable as exposure to direct sunlight.

"(e) Exposure to direct sunlight is most deleterious to the eggs, probably because of their desiccation.

"(f) A water-laden pit is as favorable an environment as the shady outdoors during alternating fair and rainy weather.

"(g) The spread of *S. mansoni* is greatly dependent upon the site of defaecation and upon prevailing weather conditions.

"(h) Defaecation in the shade is much more dangerous than under direct sunlight, owing to a longer survival of the eggs.

"(i) Overflowing latrines may not only maintain but also facilitate the spread of the parasite."

MALDONADO, J. F. & VÉLEZ HERRERA, F. *Schistosoma mansoni* **Infection resulting from Exposure to Cercariae proceeding from Single, Naturally Infected Snails.** *Puerto Rico J. Pub. Health & Trop. Med.* 1949, Dec., v. 25, No. 2, 230–41. [Refs. in footnotes.] [Spanish version 242–55.]

"1. A total of 93 guinea pigs was exposed, percutaneously, to cercariae of *S. mansoni* proceeding from single, naturally infected snails. The snails, *A. glabratus*, were collected at Barranquitas, Puerto Rico, a highly endemic focus of Manson's schistosomiasis. About half of them passed cercariae soon after being brought to the laboratory.

"2. Fifty of the guinea pigs were sacrificed 69 to 91 days after infection; 17, at the end of six months. The remaining 26 died or were lost. The worms were removed by perfusion of the liver and mesenteric veins with the apparatus devised by Yolles, Moore, *et al.*

"3 Of the 50 guinea pigs sacrificed 69 to 91 days after exposure, 31 showed bisexual infection ; 12 revealed only male and seven, female parasites alone.

"4. Among the 17 animals sacrificed six months after exposure, seven were bisexually infected ; an equal number showed only male and three only female parasites.

"5. These findings show that *A. glabratus* may harbor *S. mansoni* cercariae of either one or both sexes, and that bisexual infection may predominate in highly endemic foci. The theory that single, naturally infected snails always gave rise to cercariae of one sex alone is, therefore, not confirmed.

"6. In the absence of the opposite sex, the male schistosome underwent normal development, but the female remained small and immature even up to six months of age."

VOGEL, H. Immunologie der Helminthiasen. [**The Immunology of Helminthiasis.**] *Zent. f. Bakt.* I. Abt. Orig. 1949, v. 154, 118*–26*.

This interesting paper deals with serological and immunological aspects of certain reactions developing in vertebrate animals infected with helminth parasites. With one exception it refers to work which has already been published and most of which has previously been considered in past numbers of this *Bulletin*. The exception referred to is the, as yet unpublished, experiments by the author and Dr. W. Minning on animals infected with *Schistosoma japonicum*. Eight of these animals were moderately infected dogs which were observed to excrete eggs in more or less equal, but slowly decreasing, numbers over a period of about three years. At the end of this time the dogs were exposed to what normally would have been a lethal dose of cercariae. All of the dogs subsequently showed a greatly increased egg output, and five of them became very ill and died. The remaining three dogs, however, were not so seriously affected and eventually recovered, thus proving that they had acquired some resistance as a result of their previous infection. Encouraged by this result the authors exposed three Rhesus monkeys, at monthly intervals, to infection with 25 cercariae each. Under these conditions, the number of eggs excreted by the monkeys at first increased steadily, but after six to nine months it began to fall, in spite of the continuing superinfection with cercariae. Finally, the egg output ceased almost completely, and at this time the exposure of the monkeys to doses of cercariae, which would have proved fatal in uninfected monkeys, was without effect, both on the egg output and on the excellent state of health now being enjoyed by the animals. This experiment, in a somewhat modified form, was repeated with two other monkeys, with similar results. At autopsies carried out on some of these animals, live, stunted, adult schistosomes of both sexes were present. The authors illustrate this slow build-up of immunity by a third example. In this case a monkey was exposed to 300 cercariae, which resulted in an infection which was marked by the passage of large numbers of eggs in the faeces, but these diminished in number, and one year after the first infection, at a time when the eggs were very few in number, the monkey was infected with 600 cercariae. This second infection again resulted in exacerbation of the egg output, but this was lower and of shorter duration than that following the first attack. A third exposure, this time to over 1,000 cercariae (normally a lethal dose for a monkey) once more caused a short rise in the egg output. It was only after a fourth exposure to infection carried out more than 18 months after the first exposure that a complete immunity against superinfection was demonstrated.

R. M. Gordon

MURPHY, F. D. & PASCALL, K. G. **Liver Fluke in the Common Bile Duct.** *Brit. Med. J.* 1950, Mar. 18, 647.

The authors observe that less than 50 cases of liver-fluke infestation in man have been recorded in Europe and in only two has the fluke been recovered surgically from the common bile-duct.

They now report three cases in their own practice seen within the last decade: two were seen in Bath and one in Plymouth.

All three patients were women of over 50, with a history of epigastric pain and flatulence, who were operated on for chronic cholecystitis. There was nothing in their histories or clinical manifestations to suggest parasitic infestation: no ova were found in the bile or faeces and there was no eosinophilia. In each case, however, from one to three flukes (one large one, measuring 15 × 18 mm.) were found in the dilated common bile-duct. They were identified as *Fasciola hepatica*. The source of the infestation was not traced, but one patient stated that she was very fond of watercress.

The authors point out that the flukes were only found because a dilated common bile-duct indicated exploration and suggest that the incidence of the condition in Britain may be greater than is realized. They refer to another case in the West of England (*Bristol Med. Chir. J.*, 1949, v. 66, 74) and add that while in none of these cases was a diagnosis made before operation, each showed a dilated common duct in the absence of jaundice. It is suggested that such a finding should raise the possibility of the presence of a liver-fluke in the common bile-duct. *H. J. O'D. Burke-Gaffney*

READ, C. P. **The Acquisition of Isotopically Labeled Inorganic Phosphate by the Tapeworm, *Hymenolepis diminuta*, with some Remarks on the Host-Parasite Relationship.** *J. Parasitology.* 1950, Feb., v. 36, No. 1, 34–40, 3 figs. [17 refs.]

ARANA IÑIGUEZ, R., MALOSETTI, H., TALICE, R. & SAN JULIAN, J. Cisticercosis racemosa de la fosa posterior consideraciones clinicas y quirurgicas. [**Clinical Observations on a Case of *Cysticercus racemosa* Infection of the Posterior Fossa.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1949, Nov. & Dec., v. 35, Nos. 5/6, 374–93, 1 fig. [35 refs.]

The English summary appended to the paper is as follows:—

"The authors report a case of racemose cysticercosis diagnosed during life and operated upon successfully. It is the first Uruguayen case of cysticercosis on which an operation was performed.

"Comments on the clinical picture and on the pathological features of cysticercosis of the nervous system are made."

JOYEUX, C. & BAER, J. G. A propos des ténias du genre *Inermicapsifer* récemment découverts chez l'homme. [**Tapeworms of the Genus *Inermicapsifer* recently found in Man.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 581–7. [10 refs.]

The occurrence as human parasites of two species of *Inermicapsifer*, namely, *I. arvicanthidis* (Kofend, 1917) in East Africa [this *Bulletin*, 1949, v. 46, 952] and *I. cubensis* (Kouri, 1939) in Cuba [*ibid.*, 1941, v. 38, 113], prompts the authors to draw attention to the medical significance of this cestode genus; and in order to help medical workers in tropical regions to familiarize themselves with members of this group they have formulated a key to the fourteen recognized species of *Inermicapsifer*. The close relationship of this genus with the genus *Raillietina* is discussed critically and it is concluded that until further evidence is forthcoming, they should be retained in separate families, the Anoplocephalidae and Davaineidae respectively.

J. J. C. Buckley

RAIMONDI, A. & DI SAPIO, G. Focolai anchilostomiasici in Provincia di Avellino. [**Foci of Ankylostomiasis in Avellino Province.**] *Acta Med. Italica.* 1949, Dec., v. 4, No. 12, 309–10.

The English summary appended to the paper is as follows :—

" The author has made an investigation, through a coprologic study, on the ankylostomiasis in the region of Avellino ; he has recognized two centers of this disease, one at Montefredane and another at S. Potito Ultra."

TORRES, J. M. **Treatment of Strongyloidosis with Hetrazan. Report of 12 Cases.** *Bol. Asoc. Méd. de Puerto Rico.* 1950, Jan., v. 42, No. 1, 30–33, 1 fig. [14 refs.]

" 1. In this small series of 12 cases, Hetrazan was found to be of no therapeutic value against the infection with Strongyloides stercoralis.

" 2. Hetrazan, in the doses used, appears to be of low toxicity for man, as demonstrated by clinical observations, repeated urinalyses, and complete blood counts."

SCHLIEPER, C. & KALIES, W. Zur Bekämpfung des menschlichen Spulwurmes *Ascaris lumbricoides* L. [**On the Control of Human** *Ascaris lumbricoides.*] *Offentl. Gesundheitsdienst.* Stuttgart. 1949, Dec., v. 11, No. 9, 298–306.

The authors refer to literature which shows that the incidence of *Ascaris* in Germany has increased to a disturbing degree during the latter years of the war and since the war ended. Some of the measures of control recommended have been effective, but others reveal ignorance of the characteristics of *Ascaris* and its eggs. The authors therefore discuss the treatment of infected people, the destruction of the eggs, the reduction of their numbers and how infection with them may be avoided.

Lack of anthelmintics is regarded by some experts as an important cause of the increase of *Ascaris* infections. A detailed description of the structure of the eggs is given and experiments are recorded on their remarkable resistance to chemical agencies. The authors conclude that, although disinfection of some surfaces (floor boards, etc.) with chemicals is possible, it is hopeless to use chemicals against eggs in the larger volumes of sewage or the contents of privies. The authors then discuss (1) treatment of human excreta to allow sedimentation of the eggs into a sewage sediment which is then heated to 70°C. to kill them ; and (2) household hygiene, especially in the kitchen. Work done on the effects of washing and other treatment of fruit and vegetables is discussed. The use of human excreta for manuring of land used for growing fruit and vegetables should be forbidden. The most important form of personal hygiene is careful washing of the hands, especially before meals. Measures of control should be explained to the people in such a way that they can be understood.

G. Lapage

SAUTET, J. Parasitisme par la *Filaria ozzardi* Manson, 1897 à l'Ile de la Désirade et plus spécialement à la léproserie. [**Infection with** *Mansonella ozzardi* **on the Island of Désirade and particularly in the Leprosarium.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 9/10, 463–5.

Of 99 adult persons (patients and staff) in the leprosarium of the island of Désirade, who were examined by thick blood films for *Mansonella ozzardi* infection, 71 per cent. were found positive. Of 49 villagers examined, 32·5

per cent. were positive ; children under 7 years of age were negative. Commenting upon the striking difference in incidence between the two communities, the author attributes the high figure of 71 per cent. both to congestion of population and to the increased facilities for the contact between man and the intermediate host. There is a higher percentage of infection in old people than in younger groups. Microfilarial periodicity was unproven statistically.

J. J. C. Buckley

KERSHAW, W. E. **Observations on** *Litomosoides carinii* (**Travassos, 1919**) **Chandler, 1931. III. The First-Stage Larva in the Peripheral Circulation. With a Statistical Analysis** by R. L. PLACKETT. *Ann. Trop. Med. & Parasit.* 1949, Oct., v. 43, No. 2, 238–60, 4 figs. [30 refs.]

Continuing his investigations on the first stage larva of *L. carinii,* Kershaw reports upon his observations on the larvae in the peripheral blood. These are shown to be more dense in venous blood taken from the leg than in mixed venous, arterial and capillary blood. They appear in the blood 50 to 60 days after exposure of the host to infection, and this figure is very constant, provided that more than one adult female has developed. There is a relationship between the subsequent rise in the larval count, the rate of this rise and its peak four to five months later. The larvae may be found in the peripheral blood after the adult worms have died, or they may disappear from the peripheral circulation while live adults are still present in the tissues. The larval count in the peripheral blood was found to vary with the external temperature, there being an increase with a rise in temperature and a decrease with a fall in temperature.

J. J. C. Buckley

VARGAS, L. & RUIZ REYES, F. *Simulium exiguum* infectado con microfilarias de *Onchocerca volvulus.* [*Simulium exiguum* **Infected with Microfilariae of** *Onchocerca volvulus.*] *An. Inst. Biol.* Mexico. 1949, v. 20, Nos. 1/2, 271–4. [11 refs.]

The English summary appended to the paper is as follows :—

" In the thoracic muscles of a female of *Simulium* (*Notolepria*) *exiquum* Roubaud, .1906, was found a sausage stage of *Onchocerca volvulus.* Two other specimens showed exuviae that most probably correspond to *volvulus.* The simuliids were collected in March, 1944, in the village of San Felipe Leon, State of Oaxaca, that has an incidence of microfilariae carriers of 60 per cent."

EUCKER, H. Zur Dosierung des Phenothiazins bei der Behandlung der Oxyuriasis. [**The Dosage of Phenothiazine in the Treatment of** *Enterobius* **Infection.**] *Deut. med. Woch.* 1950, Mar. 17, v. 75, No. 11, 361–3.

Opinions have been very varied regarding the dosage and length of the course of treatment of *Enterobius vermicularis* infestation. " Contraverm " in a five-day course, " Reconox " in a ten-day course are examples. Both of these are phenothiazine preparations. Twenty-four authors are recorded in a table, with the numbers treated, the dosage in gm. per kgm., the number of days the course lasted and, in a final column, the results, whether satisfactory or not, and whether administration caused any untoward by-effects.

The author concludes that the longer course with smaller doses is no more beneficial than the shorter course with average dosage, and that the two-day treatment with a suitable preparation is best and simplest. The dosage recommended is as follows : For children one to three years of age and weighing 8 to 13 kgm., three tablets the first day and two on the second, or

1 gm. in all ; for children three to eight years old, weighing 13 to 22 kgm., three tablets each day, or 1·2 gm. in all ; for those eight to fifteen years and 23 to 40 kgm., two tablets three times the first day and one-and-a-half three times the second day, a total of 2·1 gm. ; for those over 15 years, from 40 to 70 kgm. body-weight, four tablets thrice the first day and three the second, or 4·2 gm. in all. Of 33 patients so treated, three were still positive 20 to 40 days after the course ; 23 were cured and showed no relapse ; five were negative after the course but showed a return 33 to 37 days later, " doubtless a fresh infection " ; two remained positive with relapse at short interval.

H. Harold Scott

SADUN, E. H. **Trichiniasis in Arkansas.** [Research Notes.] *J. Parasitology.* 1950, Feb., v. 36, No. 1, 89–90.

Intradermal tests for *Trichinella spiralis* on 155 medical students and technologists in various parts of Arkansas resulted in two clear positive results. Both men lived in Little Rock and showed no clinical history or manifestations of trichiniasis.

Diaphragms from 27 unselected autopsies of Arkansas residents who died in hospital were examined and one contained *T. spiralis* larvae in sufficient numbers to be detected by the common digestion method. The specimen came from a coloured female.

The only other relevant records known to the author are those reported by WRIGHT *et al.* [*Bulletin of Hygiene*, 1944, v. 19, 201] who found the only two diaphragms examined by them to be negative.

The author adds that the State Health Department examined 200 pig diaphragms from four slaughter houses in Little Rock, which included pigs purchased through the State. No *Trichinella* larvae were recovered.

H. J. O'D. Burke-Gaffney

BROWN, M., CRONK, L. B., DESINNER, F., GREEN, J. E., GIBBONS, J. E. & KUITUNEN-EKBAUM, E. **Trichinosis on Southampton Island, N.W.T.** *Canadian J. Pub. Health.* 1949, Dec., v. 40, No. 12, 508–13, 2 figs.

Evidence of the presence of trichinosis in Eskimos on Southampton Island, North-West Territory, is presented from three sources, the incidence of eosinophilia and the results of skin and precipitin tests. Routine haematological studies revealed an eosinophilia of over 5 per cent. in 46 per cent. of 145 examined and in one instance the eosinophilia was as high as 56 per cent. Skin tests carried out on 195 out of a population of 265, showed 40 per cent. positives. Three out of seven children in their first year were positive and the highest incidence was in the 11 to 25 years' group. Precipitin tests gave positive results in 40 per cent. of serum specimens collected at random from all except very young children. Precipitin tests with living larvae gave 39 positive reactions and 25 were positive with the prepared antigen, in 98 sera tested.

It is concluded from these data, together with the fact that the infection has been demonstrated in one source of food and that Eskimos are in the habit of eating lightly cooked or raw meat, that trichinosis is probably quite common in this locality.

J. J. C. Buckley

RIEDEL, B. B. **Further Studies of the Effect of Age of Mice upon Adult** *Trichinella spiralis.* *J. Parasitology.* 1950, Feb., v. 36, No. 1, 27–8.

" The effect of age upon resistance of mice toward adult *Trichinella spiralis* was studied. On the fifteenth day after infection with 100±5 cysts it was found that the young mice (age 26–32 days) harbored more adult trichinae than old mice (age 157–171 days)."

GAASE, A. Immunisierungsversuch gegen Trichinose mit dem Schweineantigen. Ein Beitrag zu den Immunisierungsversuchen im Tierexperiment. [**Investigation of Immunization against Trichiniasis with Pig-Antigen. A Contribution to Immunological Studies with Animal Experiments.**] *Ztschr. f. Hyg. u. Infektionskr.* 1949, May 24, v. 129, Nos. 3/4, 439–43.

The author tested the immunizing power of *Trichinella* antigen prepared from pigs by injecting it into a small number of guineapigs before and after they were fed with brain substance and muscle from the thigh, upper arm, diaphragm and neck of a man who had suffered from trichiniasis with severe cerebral symptoms and had died.

Three of the guineapigs were given the infected feed first and then at intervals of two days, intraperitoneal injections of the pig antigen at dilutions of 1 : 250, 1 : 500 and 1 : 500 respectively ; five of the guineapigs were given the same doses of antigen after the infected feed (the first injection of antigen being given two days after the infected feed) ; five control guineapigs were given the infected feed without the antigen. Complement fixation tests were done on the blood of all the guineapigs from time to time and the number of *Trichinella* larvae in their muscles was counted, either when they died or when they were killed.

The guineapigs given the antigen before the infected feed showed a negative complement fixation reaction two days after the injection of the antigen, though one was doubtful ; but on the seventh day all were strongly positive. The formation of antibodies was thus in these three guineapigs delayed by comparison with the group given antigen after the infected feed and with the controls. The complement fixation reaction was positive first among the controls. On the fourteenth day after injection of the antigen the two groups given antigen showed stronger complement fixation reactions than the controls. This was most evident in the two guineapigs fed with brain substance which did not contain *Trichinella*, but its toxins. Of these two the control animal died on the 23rd day after infection, while the one given the infected feed after the antigen, lived 299 days. The numbers of *Trichinella* larvae found in the guineapigs given the infected feed before the antigen were smaller than those found in the controls, while in the group given the antigen after the infected feed, they were higher. The author likens this result to the " negative reaction " seen in other infectious diseases. He remarks that the numbers of animals used is small. As additional evidence of the existence of immunity to *Trichinella* he says that, during outbreaks of trichiniasis during the recent war many persons were not ill, although they were exposed to the same infection as those who were ; that, in areas in Germany in which trichiniasis is endemic, the clinical picture of trichiniasis is not seen ; and that the wide distribution of trichiniasis in the United States is chiefly based on the study of post-mortem material and that the clinical picture of the disease does not seem to be especially evident there. *G. Lapage*

DEFICIENCY DISEASES

NICHOLSON, C. C. **Nutritional Survey of Pupils of Elementary Schools, Mahaicony District. February–March, 1947.** *Brit. Guiana Med. Ann. 1947.* 141–51, 4 graphs.

This survey, sponsored by the British Guiana Nutrition Committee, records the heights and weights, incidence of nutritional disorders and dietary habits of school children in the district. A high incidence of dental caries and vitamin A deficiency (pigmentation of the conjunctivae and xerosis of the skin of the legs) was found.

The report is clearly an accurate and sensible description of the nutritional state of the district at the time, and so is of great value to local administrators, but of limited general scientific interest. *R. Passmore*

WILLIAMSON, A. D. & LEONG, P. C. **Keratomalacia in Singapore and its relation to Vitamin A in Milk.** *Med. J. Malaya.* 1949, Dec., v. 4, No. 2, 83–95.

A short clinical and pathological account is given of the development of keratomalacia from Bitot's spots and xerophthalmia. The basic pathological change is considered to be a keratinization of the conjunctival glands, causing changes in the composition of the lachrymal fluid. This gives the bulbar conjunctiva the appearance as if, initially dry, it had been coated with an oily substance and then washed with water.

Keratomalacia in Singapore is seen as a disease of infants and young children. It is associated with a poor prognosis for vision. The Chinese are most affected and over the last fifteen years the authors have noticed a correlation between the incidence of keratomalacia and the sale of dried and condensed milks. [Unfortunately, but understandably, they can provide no figures either for the incidence of the disease or the sale of these milks.]

The vitamin A content of various milks was estimated. Eight brands of whole milk powder gave vitamin A contents ranging from 48 to 136 I.U. per 100 ml. reconstituted milk ; for 15 full-cream sweetened condensed milks the range was 21–63 I.U. ; for seven full cream unsweetened condensed milks the range was 43–118 I.U. ; and for six samples of fresh cow's milk the range was 113–167 I.U. The authors show that infants fed entirely on some of these milks will be receiving less than 400 I.U. of vitamin A per day, as opposed to the United States National Research Council's " recommended allowance " of 1,500 I.U. per day for infants up to 12 months. It is pointed out that to prevent keratomalacia in infants, the vitamin A content of the milk (either present naturally or added as a supplement) must be adequate. Legislation to ensure that all milks likely to be used for infant feeding must conform to certain standards for vitamin A content is suggested. Until this is possible, the prevention of keratomalacia must depend on education of the public in nutritional matters. *R. Passmore*

SALCEDO, J., Jr., BAMBA, M. D., CARRASCO, E. O., JOSE, F. R. & VALENZUELA, R. C. **The Influence of Artificially Enriched Rice on Beriberi Mortality in Bataan Province.** *J. Philippine Med. Ass.* 1949, Nov., v. 25, No. 11, 519–34, 2 maps & 3 figs. [12 refs.]

The authors were able to supply an enriched rice to seven municipalities (total population about 63,500) for an experimental period of a year and to record the mortality from beriberi. Five other municipalities (total population about 29,000) provided control figures, as did the records from both groups in the year previous to the enrichment.

The enriched rice was made by mixing one part of " premix " (highly enriched rice grains impregnated with thiamin, niacin and iron pyrophosphate) with two hundred parts of ordinary polished rice by weight, so that one pound of the final mixture as delivered was guaranteed to contain 2 mgm. thiamin, 13 mgm. iron and 15 mgm. niacin. The mixing was apparently carried out in the local rice mills in the municipalities.

In the year before the experiment the first group of municipalities had 167 deaths from beriberi with a death rate of 263 per 100,000 and the second group 43 deaths with a rate of 149. During the experimental year, the deaths in the

municipalities with the enriched rice fell to 74 with a mortality rate of 117. In the control municipalities, the deaths were 48 and the rate rose slightly to 163.

[This demonstration provides good evidence that the enrichment of rice can reduce the mortality from beriberi. Yet the striking point of the investigation is that despite an enrichment policy, apparently enthusiastically carried out, there was still a death rate from beriberi of 117 per 100,000. Clearly there are many difficulties in the enforcement of enrichment. To the reviewer this provides further support for the policy of directing administrative energy and public funds to attempts to control by education and legislation the milling of rice. In this way it is known that beriberi can be almost completely prevented. Such a policy rests on a much surer scientific foundation than the dubious process of enrichment, whereby the attempt is made to replace *part* only of what the millers remove.] *R. Passmore*

HAEMATOLOGY

WELBOURN, H. F. **A Survey of Anaemia in Kampala School Children using the Copper Sulphate Method of Haemoglobin Estimation.** *East African Med. J.* 1949, Dec., v. 26, No. 12, 391–6.

The author investigated the "anaemia" of children in Uganda. The only criterion adopted was whether the haemoglobin, as estimated by the copper-sulphate method, Hynes and Lehmann's modification, was below 14 grammes or not. [It seems questionable whether the word "anaemic" can be justifiably applied to children whose haemoglobin level is below an arbitrary standard that is considerably above the mean level for children in temperate climates; Wintrobe gives means of 12·6, 12·9 and 13·4 grammes per 100 ml. for children of 5 years, 6 to 10 years, and 11 to 15 years, respectively, but see also LEHMANN and MILNE, this *Bulletin*, 1950, v. 47, 268.]

The blood from children in a European school, two primary African and several primary Indian schools and a number of secondary schools and colleges was examined.

Statistical analysis of the findings showed :—

(i) "No evidence that boys differ from girls at any age"
(ii) "A negative and approximately linear regression of anaemia on age"
(iii) "Three of the sub-samples differ significantly from the whole sample": the older European children and the younger children of the Government Indian and Primary school (Urdu group) are less anaemic than the sample as a whole, whereas the older children of the Balmandir School are more anaemic than the sample as a whole.

No statistically significant difference between the "anaemia" incidence in the three communities, European, African and Indian, was demonstrable.

There was little "anaemia" in the older children—twelve years and above; the incidence varied from one student in Makerere College (1·2 per cent.) to 11 students in Makerere Secondary School (13 per cent.).

In discussing the cause of the higher incidence of "anaemia" in the Balmandir School the author points out that this is the only entirely vegetarian school, but the same high rate was not observed in the vegetarians in other schools. [There is incidentally in this school an almost complete absence of the negative regression on age, noted in all other groups.] *L. E. Napier*

LEHMANN, H. **Iron Intake in North-West India.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Sept., v. 43, No. 2, 199–208. [16 refs.]

HYNES [this *Bulletin*, 1945, v. 42, 822] found a widespread mild iron-deficiency anaemia in North-West India, but on accepted standards the average iron intake is fully adequate. An investigation was undertaken to explain this discrepancy.

This investigation included a dietary survey, iron analysis of food, and the estimation of the "available iron" in the diet. The food iron was measured by the methods of HILL (*Proc. Roy. Soc.* Ser. B, 1930, v. 107, 205) and HILL and LEHMANN (*Biochem. J.*, 1941, v. 35, 1190).

In a dietary survey, it was concluded that the diet of the North-West Indian consists mainly of *atta* (crushed wheat) and *dâl* (pulses), and it can be taken as a fair assumption that the average daily intake of these foods is 360 and 94 grammes, respectively. The average iron content of samples of *atta* was found to be 3·98 mgm. per cent.: this figure is lower than that found by most other workers. The *dâl* (*Phaseolus radiatus*) was found to have an average iron content of 8·0 mgm. per cent.

Experiments to show the amount of iron physiologically available were then carried out by digesting *chapattis* (unleavened bread) and *dâl* with hydrochloric acid and pepsin, and it was found that an average of only 40 per cent. of the chemically available iron became soluble.

From this it was calculated that the daily average intake of chemically-available iron was from 22 mgm. to 27 mgm.; the latter figure allowed for additional iron-containing food taken by the better-to-do classes. The physiologically-available iron, however, from these sources was only 9 to 11 mgm., which is a borderline amount. This would apply only to persons with normal digestive functions, but many persons suffered from "chronic subacute dysentery", and both these and others with helminthic infections frequently have achlorhydria or at least hypochlorhydria. It is suggested that the intestinal hurry in the former cases and the reduced digestive powers in the latter will mean a further reduction in iron absorption. *L. E. Napier*

LEHMANN, H. & KAYSER, F. P. **Stomach Function in Post-Dysenteric Debility.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Sept., v. 43, No. 2, 209–14.

The gastric secretions of 53 Indian soldiers with current or cured anaemia were investigated.

From their medical histories it was concluded that in 13 of these the cause of the anaemia was past chronic malaria, in 11 heavy worm infections, and in 29 chronic dysentery; in 12 of the last group the anaemia was cured at the time of the investigation.

For fractional test meals oatmeal gruel was used. If the free-acid concentration was at no time "equivalent to > 12 ml. 0·1 N Na OH per 100 ml", the HCl was classed as deficient. The pepsin was determined—by Fuld's method as given by COLE (1944)—as $pe \frac{T^c}{t'}$; when this was >1, the result was classed as showing deficiency in pepsin digestion.

Of the 13 malaria cases one only showed deficient hydrochloric acid and none deficient pepsin; of the 11 helminthic cases, five showed deficient hydrochloric acid and four deficient pepsin; and of 29 dysentery cases, 19 showed deficient hydrochloric acid and 20 deficient pepsin. The proportions were practically the same in the anaemic and the cured cases.

To exclude the possibility that the gastric dysfunction was the cause—and not the effect—of the dysentery or its treatment, 11 patients with acute bacillary

dysentery were investigated ; of these nine had normal gastric secretions on admission but at the end of seven days only three showed normal secretions. The possibility that sulphaguanidine was responsible for this deterioration was excluded by a series of normal controls.

It was considered possible that the change of intestinal flora interfered with the production or absorption of some factor essential for normal gastric secretion. Trials with nicotinic acid (niacin) administration did not suggest that this was the factor, but in a subsequent investigation with J. WALTERS and R. J. ROSSITER, it was shown that riboflavin restored normal gastric function in starvation debility. *L. E. Napier*

ADHIA, G. D. & SHAH, B. R. **Ineffectiveness of Vitamin B_{12} in Cooley's Anaemia and Drug Reactions. A Case Report.** *Indian J. Med. Sci.* 1950, Jan., v. 4, No. 1, 8–10.

WRIGHT, F. J. & PEARSON, A. W. **Sickle Cell Anaemia in an Indian Family.** *East African Med. J.* 1949, Sept., v. 26, No. 9, 255–9, 1 pl.

The vast majority of persons with the sickling trait or with sickle-cell anaemia are Africans or American negroes, but instances of sickle-cell anaemia in white persons have been described. BERK and BULL [this *Bulletin*, 1944, v. 41, 145] described an instance of this disease in an Indian woman living in South Africa, but in none of her sixteen relatives, including both parents, were they able to demonstrate the trait.

The authors report two cases of sickle-cell anaemia in an Indian family of eight children. The mother and two other children showed the sickling trait but were not anaemic. The father and three other children were free from the trait and of the eighth child there was no haematological record. The lowest haemoglobin record of those having the trait was 15·96 grammes per 100 ml. whereas that of the two patients with anaemia was 12·60 and 14·11 grammes, when they were examined as a family in 1947.

The first patient was a male child, first seen in 1943 : a history of weakness, frequent febrile attacks, pains in the limbs, easy bruising, and jaundice of one year's duration was given. He had a cleft palate, a hard spleen, enlarged to three-fingers'-breadth, a mitral systolic murmur, frequent fever, and painful swellings of the hands. A diagnosis of chronic haemolytic anaemia was made. The blood showed a moderate normochromic anaemia with 25 per cent. reticulocytes and a normal bleeding time and red cell fragility.

In February 1947 the child was still anaemic but the anaemia was microcytic (M.C.V.=69 cu. u), reticulocytes were only 3·4 per cent., the red cell fragility was decreased and a fresh preparation showed marked sickling in six hours and almost complete in 24 hours.

The second child, seen in 1943 and again in 1946 and 1947, presented a very similar history (jaundice and splenic enlargement) and haematological picture. There was, however, only moderate sickling in 24 hours. At the later examinations, painful swellings were found in both biceps, sub-periosteal swellings of the tibia, pains in the limbs, and high fever.

Among the three persons with the trait the mother showed a few sickle cells in the second preparation, one child showed oat forms only, and the other oat forms with a few sickle cells. *L. E. Napier*

SULLIVAN, B. H., JR. **Danger of Airplane Flight to Persons with Sicklemia.** *Ann. Intern. Med.* 1950, Feb., v. 32, No. 2, 338–42, 1 fig. [11 refs.]

" 1. A case is presented of sicklemia with sudden splenic enlargement and electrocardiographic abnormalities following airplane crossing of the Rocky Mountains.

"2. Attention is called to the dangers of anoxemia in persons with sicklemia or sickle cell anemia.

"3. The high incidence of sickle cell trait in Negroes is mentioned, and some military implications suggested."

VENOMS AND ANTIVENENES

REID, C. C. & FLECKER, H. **Snake Bite by a Taipan with Recovery.** *Med. J. Australia.* 1950, Jan. 21, v. 1, No. 3, 82–3.

This is the first report of a case of bite by *Oxyuranus scutellatus* with recovery, and in which the snake was identified with certainty. The victim was a young healthy aboriginal boy who was bitten on the outer aspect of the right ankle (through the boot, "thick sock and very thick skin"!) A tourniquet was applied "around the right thigh" and the bite wound incised with a chisel, the incision causing severe haemorrhage.

The onset of symptoms occurred 15 minutes after the bite. The first thing noted was inability to open the eyes. This was followed by drowsiness, nausea and difficulty in breathing. The patient was first seen by a doctor four hours after the bite and was then almost unconscious. The heart rate was 140 per minute; the skin was cold and dry. Tiger snake antivenin was given intravenously with glucose solution. The following morning the patient was flown to hospital where the pulse rate was recorded as 120 per minute, and the blood pressure 130/70. He was still unable to open his eyes and appeared to have some facial weakness but no ocular paralysis. Pupils reacted to light but all reflexes were sluggish. There was considerable weakness of arms and legs. He could answer questions but was drowsy. More antivenin (kind not stated) was administered intramuscularly and intensive intravenous glucose therapy was initiated, with *Mist. pot. cit.* "to maintain the alkalinity of the urine." A total of 3½ litres of glucose solution was given intravenously over 24 hours. Antitetanic serum was given on the third day. The patient improved steadily but developed serum sickness four days later. He recovered rapidly from this and was discharged 19 days after being bitten. The patient's haemoglobin value was only 40 per cent. a week after the bite, but the authors consider that the anaemia was due to the crude surgery with the chisel to which he had been exposed; haemolysis was not a pronounced feature of the illness. There was no jaundice and albuminuria occurred only occasionally. [See also this *Bulletin*, 1941, v. 38, 166.] *B. G. Maegraith*

PROTOZOOLOGY: GENERAL

FAUST, E. C. **The Intestinal Protozoa of the Guinea-Pig.** *An. Inst. Biol.* Mexico. 1949, v. 20, Nos. 1/2, 229–50, 21 figs. on 2 pls. [58 refs.]

BLANC, G., BRUNEAU, J. & CHABAUD, A. Quelques essais de transmission de la toxoplasmose par arthropodes piqueurs. [**Attempts to transmit Toxoplasmosis by Biting Arthropods.**] *Ann. Inst. Pasteur.* 1950, Feb., v. 78, No. 2, 277–80.

For more than 30 years it has been thought likely that *Toxoplasma* is transmitted by an Arthropod, and that if the stages in the vector could be discovered it would help to decide the position of these parasites in relation to

the Sporozoa. If there is an Arthropod vector it is likely to be non-specific, having regard to the fact that the parasite is found in a large number of types of vertebrate. The other possibility, that there is direct transmission of the parasite through the mucous membranes seems improbable because *Toxoplasma* lives so short a time outside the tissues of its living host : no resistant form is known.

It is shown here that if fleas (*Xenopsylla cheopis*) are fed on an infected animal the *Toxoplasma* may be recovered from them by inoculation, but it only persists in the fleas for a matter of hours. In a rather similar way several other biting arthropods (adult *Stomoxys* and *Aëdes* and larvae of *Rhipicephalus*) can be infected by feeding, but retain the infection for a short time and do not transmit it by bite. In the present series of experiments those mammals which had not become infected by bite or by inoculation were subsequently shown in each case to be susceptible when inoculated with living infectious material.

The authors point out that transmission by bite has not been established in any single case. They feel that very much more work is required on the relation between *Toxoplasma* and biting arthropods. *P. A. Buxton*

ENTOMOLOGY AND INSECTICIDES : GENERAL

KARTMAN, L. & BALOCK, J. W. **The Oriental Fruitfly as a Possible Cause of Myiasis in Man.** *Hawaii Med. J.* 1950, Jan.–Feb., v. 9, No. 3, 160–62, 1 fig.

BHATIA, M. L. **A Simple Medium for Mounting Mosquito Larvae.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 283–4.

The ideal method of making permanent mounts of mosquito larvae has always eluded both instructors and systematists alike. The author describes a medium he has evolved from materials readily available in all parts of India.

It consists of 50 gm. of crystallized pine rosin dissolved in 75 cc. of eucalyptus oil. This is allowed to stand, decanted and is then ready for use. Larvae need not be completely dehydrated but may be mounted from 95 per cent. alcohol into this medium. The larvae become transparent in half an hour and the slide is dry and can be handled in two to three days without special heat. Sealing is unnecessary. *H. S. Leeson*

VAN HEERDT, P. F. **A Small Grading Temperature Apparatus for Entomological Use.** [Correspondence.] *Nature.* 1950, Feb. 25, 323, 2 diagrams.

GALLIARD, H. & NGU, D. V. Culicidés du Tonkin. III. Culicidés de la Baie d'Along. [**Culicidae of Tonking. III. Culicidae of the Bay of Along.**] *Ann. Parasit. Humaine et Comparée.* 1950, v. 25, Nos. 1/2, 61–8, 7 figs.

WYGODZINSKY, P. Contribuciones al conocimiento de los *Simuliidae argentinos.* I. Introducción. Redescripción de *Simulium lahillei* Paterson & Shannon, 1927 (*Diptera*). [**Contribution to the Study of Argentine Simuliidae. Redescription of *Simulium lahillei*.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1949, Aug., v. 2, No. 3, 303–19, 7 figs. [17 refs.] English summary (8 lines).

The English summary appended to the paper is as follows :—

" The author relates shortly the historical development of the research on the simuliid fauna of Argentina, and gives a list of the species known up till now for the different provinces and territories. *Simulium lahillei* Paterson & Shannon, 1927, is redescribed, based on detailed study and the necessary figures of the male, female, pupa, larva and egg. Short considerations on the systematic position and the biology of the species are made."

CAMIN, J. H. **An Isolation Chamber for the Study of Individual Ectoparasites on their Hosts.** *J. Parasitology.* 1950, Feb., v. 36, No. 1, 41–4, 2 figs.

KARANDIKAR, K. R. & MUNSHI, D. M. **Head Capsule and Mouth Parts of** *Ctenocephalides felis* **Beuche.** *J. Univ. of Bombay.* Sect. B. Biol. Sci. 1949, Nov., v. 18, Pt. 3, 60–76, 7 figs. [17 refs.]

JONES, B. M. **A Method for studying the Distribution and Bionomics of Trombiculid Mites (Acarina : Trombidiidae).** *Parasitology.* 1950, Jan., v. 40, Nos. 1/2, 1–13, 7 figs. [35 refs.]

The author reviews the methods which have been used to assess the distribution of Trombiculid mites both in Europe and in South-East Asia. These are indirect, deduced from the distribution of the disease of which they are the vector or from the presence of the rodent host ; or direct, by boot collections or visual search. The author himself estimates the soil population of larval mites by a simple light trap.

An account is given of a survey of a garden in Edinburgh where mites (*Trombicula autumnalis* Say) were numerous and a wide range of habitats was available for a small animal. Forty-seven light traps were laid and seventeen of these were positive for mites, all seventeen being confined to two areas ; a shady moist path and a small wood. The mites in the latter area were distributed in well-defined small pockets of infection which did not shift during the survey. Sites within a radius of six feet from such a pocket might remain completely negative. This distribution explains how only one person of a party in such an area may be attacked by mites. Of physical conditions humidity appears to be the limiting factor ; recordings for positive sites were consistently high and never below 78 per cent. relative humidity. Temperature is certainly responsible for the disappearance of mites from the light trap catch as the year progresses, and their fewer numbers in the morning than in the afternoon. This appears to be a matter of activity. The rôle of *p*H as an environmental factor is doubtful.

Larval mites disappear completely in mid-October and a few nymphs were caught in September. The author therefore concludes that the winter is passed in the nymphal or adult stages, and considers the occurrence of nymphs in culture at room temperature in September as confirmatory evidence. The reported association of mites with fruit bushes does not occur unless the physical conditions (especially humidity) are favourable. If fed larvae dropped from birds while the latter were eating fruit and fell into suitable soil the life cycle would probably be completed there and give rise to a high local population. Aggregation of mites seems to be a tactile response facilitated by high humidity.

J. H. Sudd

PHILIP, C. B. & TRAUB, R. **Two New Species of Trombiculid Mites from Malayan Bats.** *J. Parasitology.* 1950, Feb., v. 36, No. 1, 29–33, 2 figs.

"Described as new from Malayan bats are the larval mites : *Trombicula batui* n. sp., and *T. insolli* n. sp. (holotypes in the U.S. National Museum, Washington, D.C.). A lectotype is established from among the remounted cotypes of *T. piercei* Ewing from bats in the Philippine Islands and comparative characters discussed."

DAWSON, Katherine E., SHERMAN, A. J. & LABOCCETTA, A. C. **Tick Paralysis : Report of a Case in Philadelphia.** *Amer. J. Dis. Children.* 1950, Mar., v. 79, No. 3, 491–4, 1 fig.

"A case of tick paralysis in Philadelphia is reported. It is the sixteenth case reported east of the Mississippi River, the second north of the Mason-Dixon

Line and the first from Pennsylvania. This case is atypical in that there was no progression of the disease after forty-eight hours, although the tick was not discovered until six days after the onset of symptoms, suggesting that the syndrome caused by the bite of Dermacentor variabilis Say is less severe than that caused by the bite of Dermacentor andersoni Stiles."

TOMS, B. A. **Mosquito Control : an Investigation of Natural Surface Films in relation to the Spreading of Larvicidal Oils upon Water.** *Bull. Entom. Res.* 1950, Feb., v. 40, Pt. 4, 503–10, 1 fig.

The spreading of larvicidal oils is hindered by the presence of natural films upon the surfaces of pools and streams. These films may be visible or invisible. Their foundation is believed to be bacterial slime, in which may be embedded biological contaminants (bacteria, protozoa, algae or pollen) or mineral matter (dust or inorganic colloids). The films possess a certain rigidity and resist displacement by weak forces ; but a slight breeze tends to drive them to the leeward of a water surface.

In order that a larvicidal oil should push back a natural film, its spreading pressure must be greater than the resisting power of the film. Measurements of the resisting powers of natural films can easily be made in the field by the method described by ADAM [this *Bulletin*, 1946, v. 43, 255]. Drops of liquids of known spreading pressures are applied, going up a series until the spreading level is found. The author has used this method on a wide variety of natural mosquito breeding grounds in West Africa. He found that natural films were of two types ; uniform and non-uniform. The former were usually over ponds or swamps with uninterrupted surfaces and no visible scum. The latter were characteristic of swamps or slow-flowing streams with surfaces cut up by natural barriers (floating debris, weeds or mud). On the windward side of the barrier (or up-stream) there was often a visible scum. The resistance to spreading pressure varied very greatly, being over 45 dynes/cm. near the barrier and falling away to 5–10 in a dozen feet or so.

The values for 323 determinations of resistance of natural films were plotted against frequency. The result was a sigmoid curve, flattening off above 30 dynes/cm. (75 per cent. of all observations). It was concluded that a larvicide for use in West Africa under the conditions then obtaining should have a spreading pressure of 30 dynes/cm. *J. R. Busvine*

MER, G. G. & DAVIDOVICI, S. **A Method for estimating the Toxic Effect of Contact Insecticides on Mosquitoes and House-Flies. With a Statistical Analysis** by R. BACHI. *Parasitology.* 1950, Jan., v. 40, Nos. 1/2, 87–92.

The authors investigated the rates of survival of anopheline mosquitoes and houseflies after different periods of contact with a surface sprayed with DDT.

(1) *Anopheles sacharovi.*—Unfed, non-gestating (meagre) anophelines were exposed to glass plates which had been sprayed with a 5 per cent. solution of DDT in kerosene to give a deposit of 2 mgm. per sq. cm.

Results :—

	DDT-sprayed surface			Kerosene sprayed surface
Duration of contact in minutes	2·5	5	10	10
Average life of anophelines in hours ...	21·09	5·205	3·3	35·91

The average length of life of meagre females after exposure for five minutes to glass surfaces treated with 2 mgm./sq. cm. of DDT decreased with increasing concentrations of DDT except at the highest DDT concentrations, *i.e.*, 1 to 5 per cent. when the average life was to a large degree independent of the DDT concentration.

Percentage concentration of DDT	*Average life in hours*
0·25	16·2
0·5	7·8
1·0	5·25
2·5	4·65
5·0	4·95

A. sacharovi females after a blood meal and carrying eggs were less susceptible to DDT than meagre females.

(2) *Houseflies.*—Females one to two weeks old (*i.e.*, females with eggs) were more resistant to DDT than females twenty-four hours old. At the higher DDT concentrations, 2·5 to 5 per cent., the survival rate was largely independent of the concentration.

	Concentration								
	5%		2·5%		1%		0·5%		0·25%
Test number ...	1	2	1	2	1	2	1	2	1
Average life in hours	0·65	0·75	0·75	0·85	1·1	1·2	2·5	2·9	2·5

C. M. Harrison

FLUNO, J. A., RAUN, E. S., DEONIER, C. C. & FAULKNER, F. **Comparative Toxicity of DDT and some of the Newer Insecticides to Adults of Salt-Marsh Mosquitoes.** *Mosquito News.* 1949, Mar., v. 9, No. 1, 15–18.

Plots in densely wooded areas of Florida were sprayed (from the air and from the ground) with DDT, benzene hexachloride (gamma isomer content 6 per cent. and 12 per cent.), technical chlordane, and chlorinated camphene. The predominant species of mosquitoes were *Aëdes taeniorhynchus*, *A. sollicitans* and *Psorophora confinnis.*

(1) *Airplane applications.*—The insecticides were applied as 5 per cent. solutions in No. 2 fuel oil at the rate of 2 quarts per acre. Whereas benzene hexachloride of both 6 and 12 per cent. gamma isomer content gave an immediate reduction in numbers of mosquitoes equal to that of DDT, DDT was more effective after 24 hours. DDT also gave a greater reduction in numbers of mosquitoes than chlordane or chlorinated camphene.

(2) *Ground applications.*—Five per cent. of the insecticides in No. 2 fuel oil were applied by 3-gallon pressure sprayers, at the rate of 1 lb. of active ingredient per acre. Under conditions of heavy rainfall 5 per cent. DDT suspension and a 5 per cent. DDT oil solution were effective against mosquitoes for 11 days. Benzene hexachloride, chlordane and chlorinated camphene and a 5 per cent. DDT emulsion were only effective for 4–5 days. Applications of all the insecticides made in dry weather reduced mosquito populations for 11 days, the order of effectiveness as residual treatments being DDT, BHC, chlordane and chlorinated camphene. *C. M. Harrison*

STIERLI, H. & SCHMITZ, W. R. **The Operation and Physical Evaluation of Routine Applications of DDT Larvicides by Airplane.** *Mosquito News.* 1949, Mar., v. 9, No. 1, 1–7, 4 figs.

Air spraying of DDT was conducted at the Savannah Wildlife Refuge during 1946 to determine the effects on natural fauna [see this *Bulletin*, 1948, v. 45, 46]. This paper deals with physical measurements of the spray characteristics and weather data. The DDT applications were made by PT17 airplanes fitted with equipment described previously [*ibid.*, 1948, v. 43, 1111 and *Bulletin of Hygiene*, 1949, v. 24, 989]. Such equipment dispersed the DDT solution either as a spray (from 5 hollow-cone spray nozzles mounted on the wings) or as an aerosol (by two atomizing nozzles projecting into the engine exhausts).

Weather records were made at a 6 ft. recording tower. The difference of temperature of two thermometers at 1 ft. and 6 ft. indicated the air movement tendencies. Downward air movement (inversion) was most favourable for spraying, combined with wind velocities of two to three m.p.h. or less. Such conditions occurred only for 30 to 40 minutes after sunrise.

The characteristics of the ground deposits from the spray and aerosol were determined (*a*) by chemical estimation of DDT on 3 × 12 inch glass plates and (*b*) by drop size measurements from carbon-coated slides. Typical graphs are given, showing the dosage and mass median diameter of the deposits at different distances from the line of flight. The distributions of the deposits apparently varied according to whether the plane flew into the wind or at right angles to it. Thus :—

	Deposit (lb. DDT per acre)				Mass mean diameter (microns)
	Flight into wind		Flight across wind		
	Max.	Min.	Max.	Min.	
Aerosol	0·01	0·002	0·03	0·003	40–80
Spray	0·18	0·03	0·18	0·07	60–280

With both methods, there was close correlation between droplet size and amount of deposit.

Regular weekly spraying was applied to two ponds (270 and 185 acres) and aerosol treatments to two others (120 and 240 acres). The output dosage of both spray and aerosol was at the rate of 0·1 lb. DDT/acre. The airplanes made the application in 100 ft. distant swathes at about 30 ft. height. The recoveries at the surface were assessed by deposits at twelve sampling plates per pond. The mean recovered dosage from aerosol treatment was 0·005 to 0·032 lb./acre (*i.e.*; only 5 to 25 per cent. of that applied). Variation *between* the twelve sampling points was 0·006 to 0·017 lb./acre. With the spray, the mean recovery was 0·037 to 0·096 lb./acre (37 to 96 per cent.) and the variation between sampling points was 0·031 to 0·124 lb.

It will be seen that about four to six times more DDT was deposited by the spray than by the aerosol. *J. R. Busvine*

SCUDDER, H. I. & TARZWELL, C. M. **Effects of DDT Mosquito Larviciding on Wildlife. IV. The Effects on Terrestrial Insect Populations of Routine Larviciding by Airplane.** *Pub. Health Rep.* Wash. 1950, Jan. 20, v. 65, No. 3, 71–87, 7 figs.

This is the fourth paper of a series dealing with the effects of routine DDT larviciding on wild life. [See this *Bulletin*, 1948, v. 45, 46.] The effect of DDT,

applied to ponds as a spray or an aerosol from the air, on terrestrial insects on the pond margins was investigated by general observations on the abundance of insects, counts of insects found dead on the water surface and study of the catches in light traps. The amount of DDT reaching the ground was estimated at 13–88 per cent. of the amount discharged from the plane as a spray, and 1·3–18 per cent. of the amount discharged as thermal aerosol. The tests were carried out on four ponds in the Savannah River Refuge, and the area round one large untreated pond was examined as a control. A battery-operated light trap is described.,

General observations indicated a reduction in the numbers of mosquitoes, " deer-flies " (*i.e.*, Tabanids) and sandflies (*Culicoides* ?) ; grasshoppers, ants, dragonflies, damsel flies (*Odonata zygoptera*), wasps and bees did not show any obvious reduction. However, the deer fly predator *Stictia carolina* (Hymenoptera) was not affected by scarcity of its prey. A strip of water was examined for dead insects ; mayflies, damsel flies, the beetle *Donacia*, Dolichopodids and other Diptera were most abundantly found.

Specific studies were made of colonies of the Goldenrod aphis *Macrosiphum rudbeckiae* (Fitch) and of hive bees. No colony differences were found among the aphids or their predators and parasites. Five hives of bees were kept under observation. Only about a quarter of their foraging area was considered to be treated but this had the most attractive flora. No abnormalities of activity or mortality were observed in the bees, and the honey crop was, if anything, better than had been expected.

Catches with light traps were very variable but this is ascribed to ecological causes rather than to the effect of the treatment. The authors conclude that, except in the case of mosquitoes, Tabanids and sandflies, two years of routine larviciding had no catastrophic effeot on the populations of terrestrial insects.

J. H. Sudd

ENIGK, K. Die Insektizide in der Veterinärmedizin. [**Insecticides in Veterinary Medicine.**] Reprinted from *Monats. f. prak. Tierheilk.* 1949, v. 1, Nos. 3 & 4, 138–42 ; 193–216. [270 refs.]

LABORATORY PROCEDURES

BITTNER, G. **Detection of Parasites in Human Excretions.** *J. Lab. & Clin. Med.* 1950, Jan., v. 35, No. 1, 121–2.

For this technique a clear blue glass lamp filter is placed in a microscope lamp and another one is laid on the microscope mirror in contiguity with its surface (preferably on the concave mirror). A clear blue glass substage filter is then placed in the housing of the condenser of the microscope. The mirror is adjusted to give maximum light.

The material to be examined (a small portion, about the size of a half grain of rice) is mixed with warm fluorescein solution, not exceeding one drop in amount : should this amount be exceeded, contrast will be lost. The preparation is incubated for five to ten minutes at 37°C.

On microscopic examination, it will be found that amoebae, cysts, leucocytes, epithelial cells, ova and flagellates will appear a bright blue against a dull lavender background. Dead animal cells, bacteria and vegetable material will blend into the background. The longer the preparation remains intact, the greater will be the contrast.

It is added that subsequent evaporation will tend to seal the cover glass, but amoebae and other structures are not destroyed and will retain their motility, in some species for several hours.

Erythrocytes show a yellow green colour : the method may also be used for the study of leucocytes in wet preparations of citrated blood.

H. J. O'D. Burke-Gaffney

VONWILLER, P. Über Vitalmikroskopie in vivo et in situ, über Parasitoskopie und über neue Nervenfärbungen. [**Vitalmicroscopy** *in vivo* **and** *in situ*, **Parasitoscopy and a New Staining Method for Nervous Tissue.**] *Zent. f. Bakt.* I. Abt. Orig. 1949, Sept. 23, v. **154**, Nos. 6/7, Bericht pp. 194*–7*. [12 refs.]

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

D'ALESSANDRO, G. Aspetti dell'epidemiologia siciliana. [**Aspects of Sicilian Epidemiology.**] *Ann. d. San. Pubblica.* Rome. 1949, May–Aug., v. 10, Nos. 3/4, 631–55. [20 refs.] English summary.

The author begins with a review of social, physical and climatic conditions in the Island with special reference to their relationship to epidemiology. In particular he refers to the widespread lack of forestation with its resultant disastrous results on the water supply. He also refers to the effects of war conditions on epidemiology.

Turning to individual diseases he deals first with tuberculosis and malaria. With regard to tuberculosis he emphasizes two points, firstly that owing to the practical non-existence of country dwellings because of the particular agricultural system [*latifondi*] which obtains in Sicily, tuberculosis is a disease of towns and rural centres, secondly that tuberculosis of bovine origin is to all intents and purposes unknown. Malaria, on the other hand, has, since the beginning of history, been a scourge of the island, *Anopheles maculipennis labranchiae* and *A. superpictus* being the most widespread and dangerous vectors. The high incidence of infection is largely attributable to the shortness of the unfavourable cold winter season. The widespread fighting on Sicilian soil naturally resulted in an enormous increase in the incidence of malaria but a campaign of eradication with DDT undertaken within recent years had done much to alter the picture from one of gloom to one of optimism.

Both cutaneous and visceral forms of leishmaniasis are to be found in Sicily. Oriental sore appears to be more common in the interior of the island than on the coast, while kala azar is more common in the littoral. *Phlebotomus papatasi* is said to begin to increase in numbers in May, reach its height in July and then fall off gradually to disappear in October. There have been many cases of infantile kala azar in the city and province of Palermo in recent years. According to the author's experience *Phlebotomus papatasi* is chiefly the responsible vector, but *Phlebotomus perniciosus* has been found in two houses harbouring cases of kala azar.

Sandflies bred profusely in the ruins of Palermo houses destroyed by German bombing and the author refers specifically to an outbreak of sandfly fever in 1944–45. [In this connexion, the reviewer has vivid recollections of a similar outbreak which affected many Allied troops in Palermo in the late summer and autumn of 1943.]

When turning to gastro-intestinal infections the author speaks feelingly of the low hygienic standards throughout Sicily. The scarcity of water and the

facility with which it can be contaminated are important factors in the prolongation of the endemicity of typhoid fever. He believes that the significant increase of paratyphoid A in Sicily following the arrival of the Allied troops was due to their having imported the infection from North Africa.

Bacillary dysentery is widespread during the summer months, especially in children, but the recent anti-malarial campaign with DDT has also had the effect of reducing considerably the plague of flies, and this, together with the use of sulphonamide drugs and streptomycin, has resulted in a very gratifying decrease in the incidence of the disease.

Diphtheria is not a disease which affects Sicily much and such cases as occur are mild in their course.

The rickettsial diseases are represented by three distinct entities: epidemic typhus, murine typhus and *fièvre boutonneuse*, the first occurring only occasionally, the latter two being endemic. Some recent outbreaks of murine typhus are discussed in detail.

Sicily has one particular area which is a focus of trichinosis and has given rise to two epidemics, one in 1933, the other in 1945. In the latter there were 84 cases with 13 deaths.

The author concludes by emphasizing that Sicily has its own regional pathological characteristics, differing from those of other Italian regions and stemming from its topography, climatology, sociology and all the various factors which result from these, thus pointing to the most favourable way for future prophylactic measures. *G. M. Frizelle*

COONOOR. **The Pasteur Institute of Southern India, Coonoor. Annual Report of the Director, together with the Forty-Second Annual Report of the Central Committee of the Pasteur Institute Association 1948–49.** 46 pp., 1 chart. 1949. Madras: Diocesan Press.

The Report follows on the same lines as that for 1947–48 [this *Bulletin*, 1949, v. 46, 588].

Antirabic treatment was given to 18,839 patients at the Institute and Subsidiary Treatment Centres during the year. Of these, case cards were returned for over 15,000 patients. At the Institute, 283 patients received complete and 89 incomplete courses of treatment. There were four deaths (all in Asiatic patients) giving a mortality rate of 1·13 per cent. At the Subsidiary Centres 8,985 patients received complete and 5,703 incomplete courses. Among the former, there were 16 deaths (0·18 per cent.) and among the latter there were 6 (0·11 per cent.). Two of the deaths were in European patients. Detailed statistics regarding rabies are shown in 10 tables.

Research work included studies of the virus of rabies and of its aetiology, and on the cultivation of the cholera vibrio. Various routine laboratory examinations were made and the details of these 3,862 specimens are shown in an appendix.

The Nutrition Research Laboratories studied various vitamins and other nutritional problems and a table lists a total of 194 clinical investigations made.

The Southern India Branch of the Malaria Institute of India continued work on the laboratory strain of *P. gallinaceum* in fowls and its maintenance in different mosquitoes. Investigations into the production of precipitin sera in mammals and fowls suggested that the absorption of a single large dose of serum proteins on aluminium hydroxide gel injected into the peritoneal cavity of rabbits and fowls appeared to yield better results than the more orthodox methods. *H. J. O'D. Burke-Gaffney*

BOOK REVIEWS

BRUMPT, E. **Précis de parasitologie.** [A Precis of Parasitology.] 6th Edition. Entirely Revised. Vol. I. pp. xii+1–1042, figs. 1–690 & 4 pls. (2 coloured). Vol. II. pp. 1043–2138, figs. 691–1305. 1949. Paris: Masson et Cie., 120 Boulevard Saint-Germain. [7700 *fr.*]

The writing of the fifth edition of this book was completed in 1935 [this *Bulletin*, 1937, v. 34, 271]. Since then the author has travelled widely in tropical countries in both the New and the Old World; this gave him the opportunity not only of seeing again the tropical diseases of these places but also of obtaining numerous photographs to add to the illustrations of this edition. He then proceeded to scan all the new literature on the subject and in spite of increasing ill-health, early in 1949, completed this sixth edition which he still modestly calls a "*Précis de Parasitologie.*" It is certainly precise, but it can hardly be called a précis when nearly 500 pages are devoted to the Protozoa alone. The new edition contains the same number of pages as the former one but each page is half as big again. This is scarcely surprising when the immense advances in the subject since 1935 are considered. In an interesting introduction the author mentions (1) the discovery of *Plasmodium gallinaceum* (made by himself) which opened the gates to the flood of knowledge about exo-erythrocytic schizogony in malaria, (2) the utilization of the new insecticides which may lead one day to the disappearance of all insect-borne diseases from the world, and (3) new therapeutic agents such as the sulphonamides, antibiotics, rickettsial and virus vaccines, etc. These are perhaps the summits of discovery, but there are many almost equally high peaks (*e.g.* the epidemiology of yellow fever) and it is easy to understand why the work is now so much larger.

Parasitology has for its object the study of the biology of parasites and of the epidemiology of the diseases caused by them. This book includes also the methods employed for their destruction, either direct or *via* the agents responsible for their transmission. The symptomatology of the diseases is treated succinctly, as the book is not a treatise on tropical medicine; pathology is, however, described in considerable detail.

Brumpt has an outlook of his own in regard to scientific nomenclature. He believes that the too rigid application of the "Rules" tends more to complicate than to clarify the subject and that the law of priority instead of stabilizing nomenclature may actually be a cause of instability—if a species has been known by a familiar name for a long time, then, even if legally incorrect, he thinks it is better to retain it in use. In regard to actual species, he has a strong predilection in favour of multiplicity. Wherever there is the least doubt as to whether one or two species are concerned, he always refers to them as two, *e.g. Onchocerca volvulus* and *O. caecutiens*.

The arrangement of the book is the same as that of earlier editions, *viz.* an introduction dealing with the subject as a whole and common methods employed in diagnosis, followed by a section on protozoology in which the spirochaetes and rickettsiae are still included, a section on metazoa divided into helminths, annelids and arthropods, and lastly a long and remodelled section on mycology. Arthropods are treated in several ways (*a*) their identification and bionomics, (*b*) the diseases which they cause, and (*c*) methods for their destruction. There are useful and up-to-date tables on rodent reservoirs and fleas concerned in the epidemiology of plague, anopheline vectors of malaria, arthropod transmitters of the rickettsioses, tularaemia, yellow fever and other virus diseases, distribution of canine leishmaniasis, and a classified list of the antibiotics.

The second volume ends with an Addendum in which is briefly described work too recent to have been incorporated in the text. It includes the following subjects among others :—relapsing fever, *Iodamoeba*, chemotherapy in flagellate and rickettsial infections, various aspects of malaria and helminthiasis, and the use of the newer synthetics as insecticides.

It is rather unfortunate that much of the new work on the life cycle of the Haemosporidiidea could not have been included in the text, because the classification in the present edition is still the old one, where the plasmodia are defined as parasites of erythrocytes during all their developmental stages in the vertebrate host, a definition now known to be incorrect.

It is impossible to review all the new features of this book ; instead, it is proposed to consider in a little detail one subject—amoebiasis—which is of extreme importance and which the author views differently from most people. He first introduced his ideas and evidence in the fourth edition, extended them in the fifth, and now, although they have received little acceptance, emphasizes them once more in the last. In view of the paradox which amoebiasis still presents, it is at least worth while to reconsider Brumpt's views, particularly as the classical explanation has nothing to offer and even Hoare's [see below] does not provide the complete key. The orthodox view is founded on the assumed existence of a single pathogenic amoeba—*E. histolytica*—which lives in the tissues of the large intestine and in a proportion of infections gives rise to symptoms in the host. A single strain experimentally introduced into 20 prisoners produced 4 cases of dysentery, 14 symptomless carriers and 2 negative results. Now Brumpt points out that in England where there are several million carriers of cysts, only one or two cases of the disease occur annually—not 20 per cent. as the above experimental figures suggest should be the proportion. Brumpt's explanation is that the cysts found in temperate regions belong to different and non-pathogenic species of amoeba, *viz. Entamoeba hartmanni* and *E. dispar*. *E. dysenteriae* [=*histolytica pro parte*] is the pathogenic species, but is found normally only in tropical or sub-tropical regions, between the latitudes of 40°N. and 30°S. ; whereas the other two are cosmopolitan. Brumpt states that four-nucleated cysts with chromatoid bodies are thus found in human faeces and belong to three species : *E. dispar*, *E. hartmanni* and *E. dysenteriae*. The presence of the first two has no clinical significance, and it is of paramount importance both for the individual and for the community to be able to distinguish them from *E. dysenteriae*, otherwise thousands of so-called cases receive quite unnecessary treatment. *E. dysenteriae* itself occurs in two forms—one large pathogenic form which invades the tissues and feeds on red blood cells, and a second smaller form (the so-called *minuta*) which lives on the surface of the mucosa feeding on bacteria, etc. During convalescence or in the carrier state, the latter alone is found. Direct evidence for the existence of three species is provided by the effect of infection in kittens. *E. dysenteriae* gives rise to a fatal dysentery accompanied by macroscopic ulcers, *E. dispar* to a non-fatal diarrhoea with no macroscopic lesions and with the amoebae containing no erythrocytes. In man, the former can produce dysentery, the latter never. Cross immunity experiments support to some extent the pluralistic view. Morphologically, *E. dysenteriae* and *E. dispar* are practically indistinguishable, but this absence of morphological evidence is no more a reason for regarding them as one species than in the similar case of *Trypanosoma brucei* and *T. rhodesiense*, where such " simplification " of the classification would lead to endless confusion in the prophylaxis of the diseases the respective organisms cause. *E. hartmanni* is much smaller than the other two species possessing 4-nucleated cysts ; the trophozoite is usually 5–7 μ in diameter ; as a rule kittens are insusceptible to infection and it

is totally non-pathogenic to man. The evidence that Brumpt produces is striking; further research is obviously desirable to clarify the present anomalous situation.

Brumpt's contribution to the subject of amoebiasis is placed in between the spirochaetes and the flagellates. In these, too, as in fact throughout the whole work, Brumpt's own work figures fundamentally, and except for want of space might be reviewed in similar detail. This unique book has a flavour all its own; being the work of one man there is no conflict of ideas as is so often the case in a symposium, and the author being French, a vein of clear logic links the whole. It is improbable that a single author will be able ever again to write a book on parasitology in this style. It is the testimony of the greatest master, living or dead, of the subject. *P. C. C. Garnham*

HOARE, Cecil A. [D.Sc. (Lond.), Protozoologist to the Wellcome Laboratories of Tropical Medicine, London]. **Handbook of Medical Protozoology for Medical Men, Parasitologists and Zoologists.** pp. xv+334, 43 figs. & 3 coloured pls. 1949. London: Baillière, Tindall & Cox, 7 & 8, Henrietta Street, W.C.2. [35*s*.]

The book commences with a short but, for the student, adequate account of the general structure, functions and physiology of the protozoa. This is followed by a chapter giving a clear exposition of the principles underlying classification of the protozoa and the rules governing nomenclature as laid down in the generally accepted International Rules of Zoological Nomenclature.

The ecology of the protozoa is treated quite fully and a good account is given of host-parasite relationships in general, an account illustrated by references to specific instances of commensalism, symbiosis and parasitism among well known forms. The section on immunity in protozoal infections is particularly clearly set forth and constitutes an extremely valuable condensation in the description of a notoriously intricate subject.

The first parasites to be dealt with in detail are the amoebae parasitic in man. This section gives a particularly good description of *Entamoeba histolytica* while the remaining species are dealt with in less, though adequate, detail. At the end a useful table gives the differential characters of the species described in the text.

The flagellates of the intestine are treated much more shortly, but the student will find in the descriptions all that he will be required to know for examination purposes.

The coccidia, ciliates and coprozoic protozoa are also lightly touched upon on account of their relatively small importance in medical protozoology.

The haemoflagellates occupy the largest section devoted to a single group of parasites.

In the sections on *Leishmania donovani* it would be interesting to know the authority for the statement that there is an initial skin lesion lasting for several months, as the reviewer has never seen such a lesion. An omission in the section on diagnosis is the failure to mention any of the serological tests such as the formol gel test, the urea stibamine test and the complement fixation test with Kedrowski's bacillus antigen.

The section on trypanosomes is one of the best in the book, as one would have expected on account of the author's own original work on this group. The difficult question of classification of the trypanosomes and differentiation of species is ably dealt with and if, as seems probable, the student will still wonder if there is really any clear basis for classification of the trypanosomes, this is the fault of the trypanosomes and not of the author!

In dealing with malaria the author provides a straight-forward guide for the student and explains all points in the story of both the vertebrate and

invertebrate cycles of the parasite in a lucid manner without overcrowding the description with irrelevant details. In dealing with the question of immunity the description follows orthodox teaching.

In the chapter on parasites of doubtful nature, *Toxoplasma hominis* is given specific rank although it had previously been stated that the forms found in various animal hosts are morphologically indistinguishable and the form originally described was *T. gondii*.

Chapters 15 to 20 deal with equipment, reagents, the collection, preparation and examination of materials and the methods of cultivation of parasites. Two paragraphs in chapter 17 are, in the reviewer's opinion quite erroneous. In describing the technique of spleen puncture the needle is said to be plunged into the spleen to a depth of 3, 6 or 8 cm. while aspiration is continuous and the withdrawal of the needle is gradual. The proper procedure is quite the reverse. Three cm. gives ample penetration and withdrawal should be immediate and quick along the route taken for penetration.

The statement in the succeeding paragraph that, " as a diagnostic method for detecting leishmanias in Kala-azar, liver puncture is of little practical value . . . " is not correct as experience in thousands of such procedures has amply proved, and even the direction for deciding the exact site to puncture is erroneous.

In the section on staining, Field's stain for thick films is given but no mention is made of the more useful J.S.B. stain.

The book as a whole gives evidence of very careful preparation and is remarkably free from typographic errors, while the descriptions and style in general are eminently lucid. The print is a pleasure to read and the whole format excellent. For the student attending a course in tropical medicine and for the Colonial Medical Officer the book can be recommended as the best and most up-to-date obtainable on its subject, and in all particulars it fulfils the requirements indicated in its title. The author is to be congratulated on filling what, for some time, has been a definite gap in literature dealing with medical protozoology. *H. E. Shortt*

MATHESON, Robert. **Medical Entomology.** 2nd Edition. pp. xi+612, 4 pls. & 242 figs. 1950. New York: Comstock Publishing Co., Inc. [$7·50.]

This second edition of Matheson's Medical Entomology has been carefully revised and in parts has been rewritten. Work done during the war years by investigators all over the world has resulted in advances being made in our knowledge of disease transmission by arthropods and also in that of their morphology and their biology; knowledge thus accumulated since the first edition was published over seventeen years ago has been included in this volume which may be said to be a clear summary of the subject to the end of 1948.

As a textbook it is admirably suited to the needs of students in any part of the world, whether they be entomologists, public health workers or physicians, though the physician must not expect to find a section on treatment. If it could have been found possible to include a classification table showing the relationship of the different insects to each other it would have been appreciated by the average student. Naturally, corrections and additions have had to be made in certain chapters and sections, among which are those dealing with ticks, mites, sylvatic plague, murine typhus, yellow fever and malaria. Recent discoveries will make a further amendment necessary in the malaria section. In the sections on control of the various insects the main addition is due to the discovery of the value of the insecticide DDT; other insecticides are mentioned but not gammexane. In the chapter on collecting, preserving and

mounting insects, there is added a brief reference to the use of polyvinal alcohol as a mounting medium. The valuable lists of the more important journals and books which the student must consult from time to time, are again included and the selected bibliographies appended to each chapter have been extended to include more recent references, though the second edition (1947) of *The Louse* by BUXTON should have been included instead of the first.

Teachers of medical entomology as well as students should learn much from the author's treatment of his subject. The arrangement is convenient, entomological terms have thoughtfully been kept to a minimum and most of the illustrations transferred from the first edition have been improved by enlargement. The opportunity might have been taken to re-arrange more naturally the illustrations of antennae in fig. 51. Considerable trouble has been taken over the selection of suitable type both for the body of the text and for the headings of chapters and paragraphs, making it an easier book to read and to handle. The complete index occupies twelve pages. *H. S. Leeson*

ROGERS, Leonard [K.C.S.I., C.I.E., LL.D., M.D., F.R.C.P., F.R.C.S., F.R.S., I.M.S. (retd.)]. **Happy Toil. Fifty-Five Years of Tropical Medicine.** With a Foreword by Major-General Sir John W. D. MEGAW, K.C.I.E. pp. xvi+271, 20 text figs. & 8 pls. 1950. London: Frederick Muller Ltd., 29 Great James Street, W.C.1. [18*s*.]

"Happy Toil" is a singularly apposite title for this self-revealing autobiography. There can have been very few who having attained the age of 82 could look back upon a lifetime of unremitting labour for the benefit of suffering humanity with fewer regrets than does Sir Leonard Rogers.

Those of us who were working in India during the first two decades of this century are unlikely to have forgotten the almost ceaseless flow of important contributions to tropical medicine made by Rogers during those fruitful years—amoebic dysentery, liver abscess; treatment of cholera; treatment of leprosy; tropical fevers. To read again summaries of that work against the background of the limited knowledge we previously possessed, and of the difficulties encountered in the elucidation of those problems, has been of absorbing interest.

Not the least of Sir Leonard's claims to lasting fame is the Calcutta School of Tropical Medicine and Institute of Hygiene which owe their existence to his persistent endeavour and dauntless refusal to accept rebuff. The story is fully related in this volume.

A foreword to the book is written by Major-General Sir John Megaw. The opening paragraph of that foreword can be heartily endorsed:—"This book is remarkable, not only as a valuable contribution to the history of medical research but also as a human document of exceptional interest. It will appeal specially to medical men, but other readers cannot fail to be deeply impressed by the story of a man who has achieved fame and happiness, not by pursuing them as direct objectives but by living a life of intense effort to relieve distress among his fellow-men." *Norman White*

CALVERLEY, Eleanor T. [M.D.]. **How to be Healthy in Hot Climates.** pp. xi+275. 1949. New York: Thomas Y. Crowell Co. [21*s*.]

Dr. Calverley has written a readable book for those (especially missionary workers) who go to live in the tropics, and by submitting drafts of many of her chapters to experts for their opinion, has taken pains to ensure that her text is accurate and suitable to the purpose. She opens with a chapter entitled

"Is it safe to live in the tropics," and goes on to discuss preparations and equipment, the new environment, women and children in the tropics, the home, household precautions, servants, food, the family, common ailments and emergencies and childbirth. She then deals with diseases of the skin, and of the eye; malaria and blackwater fever; other tropical fevers; the dysenteries; other intestinal diseases; and miscellaneous tropical diseases. There are 4 Appendices, relating to food, nursing, medical supplies, and a glossary; there is a good index. At the end of most of the chapters there is a list of books to which the interested reader is referred.

The book will admirably serve its purpose as an instruction manual for non-medical people. Its tone is reasonable in that over-simple language is avoided, and that the style is usually appropriate to what must always be a complicated subject; it is the tone of an optimistic worker with a mission to help the unfortunate and ignorant. There is more emphasis on clinical and curative medicine than on prevention, and it seems that the descriptions and explanations she gives of transmission and control of disease would leave an enquiring layman somewhat unsatisfied. For instance, nothing more is said about Japanese river fever than that it is carried by mites, or about Q fever than that it is carried by ticks.

In Appendix A there is a series of lists—of calories required by men, women and children, of comparative nutritive values of average servings of common foods, of nutritive values of foreign foods, of vitamins in foreign foods, and of other dietetic facts. Appendix B is a tabular statement of information about some of the communicable diseases. In Appendix C there is a long list of supplies for times of illness.

The book is a good addition to the relatively few satisfactory manuals for non-medical people in the tropics. *Charles Wilcocks*

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